# Spotlight
ON COTTON R&D

**SPRING 2025**

Future Cotton brings R&D to town

Industry Data Platform build begins

Growing together through Grassroots

CRDC

Allan Williams

# In the Spotlight

To say it's been a busy time for CRDC and cotton research, development and extension (RD&E) would be an understatement, as the Growers' Voice and Carbon Chat Tour winds up, the Australian Cotton Disease Collaboration (ACDC) research ramps up, the Qld DPI Future Cotton project gets underway, and the CRDC-led Cotton Industry Data Platform build begins.

Event wise, the Cotton Collective and Australian Cotton Industry Awards were held in early August in Toowoomba (Barunggam country), followed by the Association of Australian Cotton Scientists conference in late August in Narrabri (Kamilaroi country), bringing researchers together for three days of non-stop RD&E. These events are indicative of the culture of information and knowledge sharing, and the innovation and high quality of RD&E our industry is renowned for. In this edition, we bring you stories from the Collective and the Awards, and in the next edition of *Spotlight,* we'll take a closer look at the researchers conference.

In the meantime, we're set to welcome two new Innovation Brokers to the team, and we're pleased to announce that our Chair Richard Haire's term has been extended by 18 months to continue to oversee the impactful projects we are delivering under our CRDC Strategic Plan, Clever Cotton. One such project is the data platform – a major initiative that CRDC is leading on behalf of the industry. We're pleased to announce KPMG Australia as the build partner, and report that the build of the platform is now underway – a key milestone in what has been years of work behind the scenes in collaboration with all sectors of the industry to ensure the platform will be world-class, yet so specifically tailored to our industry.

The Future Cotton project with Qld DPI is also bringing together many research teams and topics to provide a systems approach to RD&E. As with the Australian Cotton Disease Collaboration (ACDC), which is taking a multi-disciplinary approach to research, Future Cotton will include a focus on on-farm disease trials that are accessible to and developed by growers, with CottonInfo providing an important conduit. Delivering real, tangible impact to growers is a core and consistent focus for CRDC across all of these projects and investments – and you can read all about the planned benefits in these pages of *Spotlight.*

We're also very conscious that it is not always the 'big' projects and pure science that drives our industry, as outlined in one of our feature stories this edition on the CRDC's Grassroots Grants program. Grower George Sypher, who was interviewed for our story, put it best: "Growers have mud on the boots and shadow on the paddock and that's where the learning happens". I strongly encourage all Cotton Grower Associations to look closely at their local needs and discuss a Grassroots Grant project with CottonInfo's Regional Extension Officers (REOs) or Program Manager Janelle Montgomery – we have funding available right now through this program.

Finally, a shoutout to the CottonInfo REOs, who have now been with CRDC for six months under the revised CottonInfo structure. CottonInfo remains a joint partnership of CRDC, Cotton Australia and Cotton Seed Distributors (CSD), with the Management Committee (CRDC and Cotton Australia) leading the program and CSD investing in the REOs. The team have hit the ground not so much running but by digging large soil pits! They swung into gear to address grower concerns around compaction during a wet harvest, with research and extension combining to provide insights and practical information to growers around compaction and soil health. It's a great example of CottonInfo's role in ensuring information gets to where it needs to be, and in helping connect growers with the relevant research and experts in the field.

Allan Williams
Executive Director

**CRDC acknowledges the Traditional Custodians of the lands of Australia's cotton communities, and recognises their enduring connection to the land and waterways that sustain us. We value the Aboriginal and Torres Strait Islander people who have cared for this country for thousands of years. We pay our respects to their Elders past, present and emerging, and extend that respect to all First Nations peoples today.**


# Spring 2025


## FEATURES



AVANELL MORAWITZ

**ON THE COVER:**
**New horizons and new connections for Central Qld growers as part of a CRDC Grassroots Grant.**

## Want to see more of Spotlight?

This edition can be viewed online at: www.crdc.com.au

## COTTON NEWS




*Spotlight* is brought to you by Australia's cotton growers and the Australian Government through the Cotton Research & Development Corporation (CRDC). CRDC is a research, development and extension partnership between the Australian cotton industry and the Australian Government.

CRDC
COTTON RESEARCH AND DEVELOPMENT CORPORATION

**Cotton Research and Development Corporation**
ABN: 71 054 238 316

**Vision:** A sophisticated, prosperous and sustainable Australian cotton industry, strongly connected to its value chain.

**Mission:** Delivering world-class outcomes for the cotton industry through thought leadership, innovation, adoption and collaboration.

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# IPM success is a group effort

**INTEGRATED** pest management (IPM) in cotton is a story of innovation and resilience.

Born out of the urgent need to overcome severe *Helicoverpa armigera* insecticide resistance that once jeopardised the industry's future, IPM has grown into a comprehensive approach tackling all of cotton's insect and mite pests. A clear breakthrough arrived in 2004 with Bollgard II technology, which eased the daily battle against Helicoverpa and allowed farmers to refocus on agronomy. Even so, the journey since hasn't been all smooth sailing with new pest challenges and, more recently, the resurgence of insecticide resistance.

But at the heart of IPM's success is something even more valuable: growers and their consultants. For those who haven't experienced what it was like to battle resistant pests in conventional cotton, the hard yards undertaken to develop IPM might seem unrelatable. However, the innovations that have arisen from pest research over the past 50 years have created a solid foundation for sustainable pest management not only today but also well into the future.


*The Integrated Pest Management: Optimising your early season pest management* booklet from CottonInfo is designed to provide essential IPM insights and practical tips to help get a crop off to a fantastic start for the season. Dive in and discover how IPM continues to evolve thanks to the dedication and foresight of the people shaping its future.

Developed by Qld DPI's Dr Paul Grundy, CottonInfo's IPM Technical Lead and highly respected industry scientist, this publication takes a refreshing a new lens to crop management.

Available for download from www.cottoninfo.com.au/publications-and-media

**Cotton Australia's Adam Kay with board members Daniel Kahl, Tony Geitz, Bernie Bierhoff, Liz Stott, Bruce Connolly, Angus O'Brien, Gavin Dal Broi, April Cavanagh, Matt McVeigh and Rob Dugdale.**

# Leeton grower Liz Stott new Cotton Australia chair

**RIVERINA** cotton grower Elizabeth Stott has been elected as Chair of Cotton Australia at its AGM, held at the Cotton Collective in August.

Liz has been a director of Cotton Australia since 2021 and has served as deputy chair for the past two years.

With husband Dallas, they run an irrigated farm near Leeton (Wiradjuri country). Their first foray into cotton was in 2010-11, when they planted 120 hectares. They've wasted no time in optimising their operation, and were early adopters of bankless channel layouts and irrigation automation, sharing their results with fellow growers throughout cotton growing regions. Today, they will plant up to 1000 hectares of cotton depending on the season.

Liz brings a professional background in water policy and public relations to the board, having held roles on a number of advisory boards including the National Water Grid Advisory Body. She is currently on the board of Riverina Local Land Services. Liz is a graduate of the Australian Institute of Company Directors' course, holds post graduate qualifications in science and rural leadership, and completed the Australian Rural Leadership Program in in 2014.

"We are committed to innovation and continuous improvement, embracing technology and research to grow high-quality crops efficiently and sustainably," Liz said.

"We received our full *my*BMP accreditation early this year and see that as playing a part in improving our farming outcomes while streamlining business practices.

"I'm looking forward to working with growers on all the really exciting initiatives that are underway such as the Australian Cotton Industry Strategic Roadmap.

"This Roadmap is going to ensure Australian growers remain a supplier of choice in a changing world, and I know we are up for the challenges and opportunities that lay ahead."

Liz moves into the seat vacated by Central Qld grower Nigel Burnett who served for 12 years on the board, including four as Chair.

"At the meeting we acknowledged the tireless efforts of Nigel and outgoing Director Arthur Spellson, both of whom have made great contributions to the organisation and the industry," Cotton Australia CEO Adam Kay said.

"And we welcomed new Directors to the Board – Tony Geitz and Gavin Dal Broi. Tony was recently appointed as CEO of Northern Cotton and was previously the Australian Managing Director of Louis Dreyfus Company. Gavin Dal Broi is an irrigated grower from the Southern Valleys and Chair of Rivcott Ginning."

**For more**
**Cotton Australia**
www.cottonaustralia.com.au

# Industry welcomes CRDC Chair reappointment

**CRDC** Board Chairman Richard Haire has been re-appointed to the position until February 2027. The Hon Julie Collins MP, the Minister for Agriculture, Fisheries and Forestry, made the announcement in August, allowing Richard to continue to oversee the rollout of CRDC's current strategic plan, Clever Cotton.

Richard's initial stint as Chair began in 2016, and he was reappointed in 2019, 2022 and now 2025. His association with the board began in 2011 as a director, however his commitment and involvement in the cotton industry extends back decades.

Richard is from a cotton farming family in the Namoi Valley, where his brothers continue to farm. He's held many leadership positions within the cotton industry, most recently as Managing Director and regional head of Olam International. He was formerly the Chief Executive of Queensland Cotton and a member of the Rabo Australia Food and Agribusiness Advisory Board.

"Having Richard at the helm for another two years gives the organisation stability and the benefits of his experience and knowledge," CRDC Executive Director Allan Williams said.

MELANIE JENSON

**CRDC Board Chairman Richard Haire (right) has strong ties to the cotton industry at all levels. He is pictured with farm manager Ben Kirkby and CottonInfo Program Manager Janelle Montgomery at "Norwood" Moree (Kamilaroi country) last year, where they discussed cotton disease and irrigation management.**

"This reappointment is also testament as to how much Richard's expertise and management is appreciated.

"We've embarked on some ambitious long-term research and development projects under our Clever Cotton strategic plan, including the industry data platform and the Australian Cotton Disease Collaboration which Richard is keen to see to implementation."

# Returning to R&D with Innovation Broker roles

**CRDC** has welcomed two new Innovation Brokers who are no strangers to cotton and research, development and extension (RD&E). Felicity Muller and Shakira Johnson will start in the roles in late September.

Felicity is 'coming back' to the cotton industry having cut her teeth as a researcher based in rural NSW.

"I love meeting people and learning – so the opportunity to be at the forefront of emerging technologies and solutions to problems impacting the cotton industry is such an exciting opportunity," she said.

"I look forward to meeting people throughout the industry and working with them on some of these challenges."

Felicity formed an early association with the cotton industry through her university studies at the University of Sydney, as the recipient of an honours scholarship supported by the cotton industry, looking into the impacts of soil sodicity on cotton production at Hillston (Wiradjuri country) in the Lachlan Valley, NSW.

"I was really impressed by the industry's willingness to support early researchers and the openness of growers in welcoming a young scientist on to their properties to build understanding of potential challenges to cotton production," Felicity said.

"This openness and willingness of growers to share their knowledge was also my experience while working at Cotton Australia. Growers were tremendously giving of their time and experience."

Felicity worked with Cotton Australia for nearly four years as a Policy Officer, focused on policy development and advocacy on the interactions between coal seam gas, mining and cotton production. She has also consulted across federal and state governments working on agricultural research for development projects, and most recently delivered advice on natural resource management issues as an advisor with the Natural Resources Commission.

Shakira is joining CRDC from AUSVEG, bringing a strong background in plant pathology and biosecurity, and an advanced science degree from La Trobe University. In her role as a project manager at AUSVEG, Shakira worked with CRDC and the cotton industry on the iMapPESTS project, trialling new technology to detect airborne pests and diseases.

"My involvement with the cotton industry through the iMapPESTS program left a very strong and lasting impression," Shakira says.

"The collaborative spirit and commitment to innovation were truly remarkable. I was struck by how engaged and unified the community was, and how willing they were to take on new and sometimes daring ideas.

"I finished that program hoping that I'd get the chance to work with the cotton industry again, and that experience was a major factor in my decision to apply for the Innovation Broker role."

Shakira's enthusiasm is obvious.

"I'm excited to immerse myself in the cotton industry and get out into the regions," she says.

"I'm looking forward to learning the ins and outs of what it takes to produce quality Australian cotton and meeting the growers, advisors, and the wider community.

"Cotton-growing regions have some of the most beautiful and unique landscapes in Australia, and I feel very lucky to be joining the industry. It's a great feeling to know I'll be able to contribute and support the industry as it continues to lead the way in agricultural innovation."

"We are really looking forward to Shakira and Felicity joining our team – it's always great to welcome people back to the industry, bringing their experience, knowledge and skills from other roles with them," CRDC Executive Director Allan Williams said.

"Shakira and Felicity's experiences working across agriculture, from research to project development, mean they are very well prepared in joining CRDC as Innovation Brokers."

Felicity and Shakira will start in late September and join fellow Innovation Brokers Susan Maas, Dr Nicola Cottee, Rachel Holloway, Stacey Vogel and Elspeth Pearce (currently on maternity leave). The team is led by CRDC General Manager, Innovation, Dr Merry Conaty.

While welcoming new faces to CRDC, the team also bids farewell to two team members.

"We farewell CRDC Innovation Broker Nick Tomkins and wish him the best as he embarks on a role as Chief Operating Officer with start-up Just Meat Protein," Allan said.

"I would also like thank Delece Hartnett, who has been an integral part of our executive support team, as she takes up a role with GrainCorp. Delece has provided outstanding support to the Board and executive team."

**For more**

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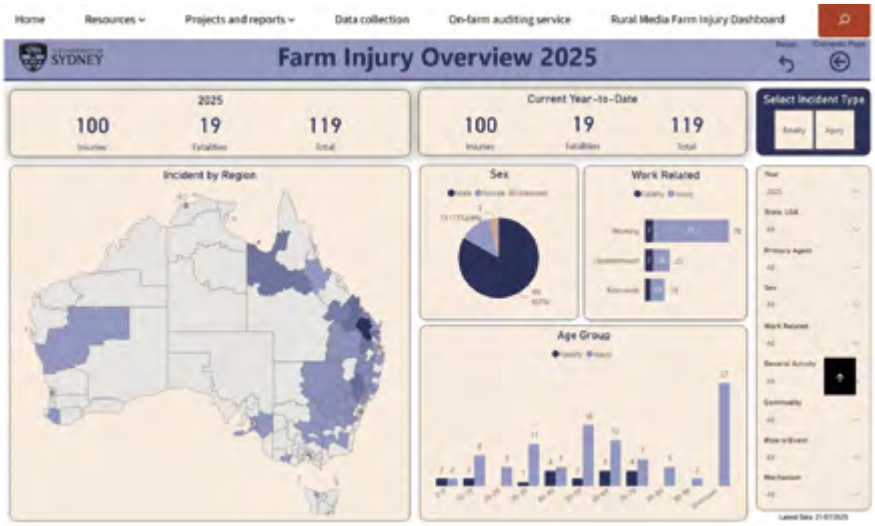


# Real time tracking of on-farm fatalities and injuries

**THE** first real-time dashboard for tracking on-farm fatalities and injuries was launched in July, giving the farming community, farm safety advocates and researchers early insights into where and how agricultural incidents are occurring – so they don't occur in the future.

Tracking on-farm fatalities and injuries is important as industries such as cotton seek to gain insight into the safety, health and wellbeing of its people. For CRDC and Cotton Australia, it provides information to guide investment decisions and extension of work health and safety on our farms. Growers also raised farm safety with both organisations on the recent Growers' Voice and Carbon Chat Tour.

The Rural Media Farm Injury Dashboard was developed as part of AgHealth Australia's Ag Safety Data Net project. It draws on live media reports to give more current snapshots of incidents occurring on-farm, before official coronial or workers compensation data becomes available. The Dashboard has been funded by the Rural Safety and Health Alliance (RSHA), a partnership of seven Rural Research and Development Corporations (RDCs), including CRDC.

CRDC Innovation Broker Rachel Holloway oversees CRDC's investment in the RSHA and says having accurate data is critical to managing risk on cotton farms and raising awareness.

"For the first time, through this dashboard we now have access to accurate and real-time data on on-farm injuries and fatalities in the cotton industry – data we can learn from to help keep people safe," Rachel said.

Moree farmer and member of the AgHealth research team, Kerri-Lynn Peachey described the dashboard as a critical step forward in improving farm safety.

"By providing real-time insights into the types of incidents occurring on farms, we can better understand the risks and work together to prevent future injuries and fatalities in a timely manner. It's a tool for awareness, education and ultimately, saving lives," Kerri-Lynn said.

"As a farmer myself, I know how quickly things can go wrong.

"Farm injuries aren't just a cost; they also result in a loss of production, impacting individuals, farm operations and rural communities across Australia. The Dashboard's charts and heatmaps will help to inform farm safety initiatives by highlighting current risks and contributing factors."

The Dashboard allows users to customise infographics and heatmaps by date, injury type, age group, industry sector and location – making it a valuable tool for policy makers, industry bodies and community safety campaigns.

The RSHA is a collaboration between CRDC, AgriFutures Australia, Australian Eggs, Australian Pork, Australian Wool Innovation, Dairy Australia and the Grains Research and Development Corporation to coinvest in research to improve safety and health on Australian farms.

**For more**

**Rural Media Farm Injury Dashboard**
https://aghealth.sydney.edu.au/rural-media-farm-injury-dashboard/

# New data platform ensures Australian cotton will be future-ready

**AUSTRALIAN** cotton growers are set to reap the benefits of digital farming, thanks to a new secure, centralised data platform that will boost efficiency, strengthen traceability and deliver the transparency that today's market demands.

The Australian Cotton Industry Data Platform is being developed by CRDC in partnership with growers and the wider cotton industry to collect, connect, analyse and share data across the Australian cotton supply chain.

The platform will simplify and automate data management, reducing duplication and saving time for everyone involved – from growers and consultants to gins, merchants and brands – in response to evolving market access requirements for information about how raw materials like cotton are produced.

The platform is a core initiative of the CRDC Strategic Plan 2023–28, Clever Cotton, and marks one of CRDC's largest investments, with $7 million allocated for designing, building and running the platform over the coming years. The scope and build of the platform is now underway, with CRDC today announcing the build partner, KPMG Australia. Once built, the platform will create a more connected and future-ready cotton industry through better use of trusted and grower-controlled data.

CRDC Executive Director Allan Williams said the platform development is informed by extensive industry-wide consultation and collaboration.

"The platform has the potential to be game-changing for our industry. It will not only streamline efficiencies for growers but also unlock new opportunities to meet global demands in an increasingly digital world," Allan said.

"With data more valuable than ever, we have worked closely with growers and the supply chain to ensure that this will be an industry-owned and grower-controlled platform that is safe, secure and reliable.

*"Data is one of five key pillars in the Roadmap due to the importance of providing evidence of our practices and improvements"*

MELANIE JENSON

**The Australian Cotton Industry Data Platform build phase is underway, with the announcement of KPMG Australia as the build partner. Michael White who is the KPMG Australia Director, Digital Agribusiness, was at Moree in early September at the Growers' Voice and Carbon Chat Tour. He is pictured with Cotton Australia's Adam Kay, Cotton To Market's Brooke Summers, CRDC General Manager, Innovation Merry Conaty and CRDC Executive Director Allan Williams.**

"This is about giving growers a trusted tool that is seamlessly integrated into existing processes, easing mounting reporting pressures and streamlining systems."

The platform will deliver value for Australian cotton growers by:

- supporting better decisions by making insights and information more accessible;
- saving time by automating data handling and reducing duplication;
- simplifying compliance with regulatory and sustainability reporting; and
- boosting market access by improving traceability and transparency to meet global buyer expectations.

Cotton Australia CEO Adam Kay said the data platform forms a key component of the Strategic Roadmap for Australian Cotton, led by Cotton Australia, CRDC and the Australian Cotton Shippers Association.

"The Strategic Roadmap aims to ensure the Australian cotton industry remains competitive in a changing global market. We want Australian cotton to be recognised as a global leader with the most sustainable, ethical and high-quality cotton available, backed up by credible evidence," Adam said.

"Data is one of five key pillars in the Roadmap due to the importance of providing evidence of our practices and improvements, and the cotton industry data platform will play this crucial role."

KPMG Australia has been awarded the contract to develop the platform, with the build phase now underway and beta testing expected from the 2025–26 cotton season. Full functionality will be rolled out by 2028, with services introduced in phases. Over time, more tools and services will be added, so the platform's value will continue to grow.

Growers are invited to a series of workshops run by KPMG Australia as part of the scoping stage of the project. They're now also being urged to get data platform ready by understanding where their data is, how it's used, and how it could connect.

**For more**

www.crdc.com.au/dataplatform

# R&D on the ground as the ACDC takes shape to combat diseases

In 2024, CRDC launched the Australian Cotton Disease Collaboration (ACDC), a groundbreaking $13 million research, development and extension (RD&E) program.

This ambitious initiative has brought many aspects of disease research under one major project to provide a comprehensive RD&E effort, previously not seen in the industry.

ACDC's primary goal is to reduce the economic impact of current and emerging diseases to less than five per cent of the cost of production. Projects are now underway across four key research areas – systems-based disease control packages, understanding pathogen behaviour, spatial data analytics and advanced modelling, and improving understanding of fungicides and mediators of plant defence. These four areas involve a varied team of specialist researchers.

Managing disease effectively means growers understand the impact of their farming system on disease development and severity and have access to rapid and accurate diagnostics, and that researchers have improved knowledge of pathogen behaviour and diversity and can create more efficient means of detecting diseases in in the field.

With the formation of the ACDC, CRDC has established long-term strategic partnerships with the University of Southern Queensland (UniSQ), led by ACDC Director, Associate Professor Sam Periyannan, and Qld DPI, led by senior cotton industry pathologist and ACDC Deputy Director, Associate Professor Linda Smith.

Diseases are ranked into two tiers. Tier 1 diseases include Fusarium wilt, Verticillium wilt, black root rot and Alternaria leaf spot. Tier 2 diseases are any other emerging or existing diseases, such as reoccurring wilt.

"Diseases such as Verticillium, black root rot and Fusarium are having a huge impact on our industry," CRDC Senior Innovation Broker Susan Maas said.

"It is really exciting to see the first projects starting – translating the strategic vision of ACDC into on ground research.

"We are also building collaborations with CottonInfo and other research providers and will look to host a disease symposium later this year to support industry coordination and collaboration on this critical issue."

**ACDC in the field: Dr Cassy Percy, UniSQ, ACDC Director Associate Professor Sam Periyannan, UniSQ, ACDC Deputy Director Associate Professor Linda Smith, QLD DPI, Dr Murray Sharman, QLD DPI and Sarah Nolan, WA DPIRD.**

## Systems approach

The ACDC will have a number of field studies this season to better understand disease in the farming system context.

Qld DPI senior plant pathologist Linda Scheikowski is investigating the impact of irrigation and nutrition management on cotton wilt disease incidence. While irrigation and nutrition management is known to have a large impact on wilt diseases, the evidence for this is anecdotal in Australia. Linda is working with UniSQ's irrigation and water management researcher Associate Professor Joseph Foley.

"We want to quantify the impacts of Verticillium and Fusarium wilts and incorporate this knowledge into grower management recommendations for irrigation and nutrition," Linda said.

"This will contribute to reduced yield loss through understanding improved wilt management options, increased water use efficiency when irrigating with a higher soil water deficit, and increased profit through reduced fertiliser application and reduced disease incidence."

Linda is also investigating how post-harvest cotton residue/trash impacts inoculum carryover, as the pathogens that cause Verticillium, Fusarium, and *Eutypella* wilts can survive in cotton residues. Post-harvest management is therefore crucial to disease management.

"Currently, there is no clear understanding of the contribution these crop residues have on inoculum build-up and disease," Linda says.

"To understand the persistence of pathogens on cotton trash after various levels of decomposition, molecular methods to quantify

the pathogens are required.

"We are currently reviewing past research to identify suitable methodologies to quantify pathogens in cotton residues and scoping potential project partners with specialist skills to quantify levels of pathogen inoculum."

### AI for wilt identification

In this project machine vision systems will be developed to detect and differentiate Verticillium and Fusarium wilts. Identifying wilt pathogens is of increasing importance as more fields are being found to have both pathogens present, yet diagnosing them in a field is still manual, time consuming and requires sound identification skills. Furthermore, the disease is not detected until symptoms are clearly visible and management options, particularly post-harvest are quite different.

Researchers have therefore looked to machine vision sensing to differentiate wilts and predict severity before visual symptoms show. The project is being undertaken with Associate Professor Alison McCarthy from UniSQ's Centre for Agricultural Engineering, who is undertaking a separate project with support from CRDC into sensing, machine learning and artificial intelligence.

This will enable field mapping to identify predicted high disease areas, assisting growers to make decisions around farming practices, such as nutrition and irrigation management to manage these diseases.

### Diagnostics under the microscope

Rapid and accurate diagnostic capability is a key aspect of disease control.

"This goes hand in hand with support for growers and their consultants," Qld DPI plant pathologist Dr Dinesh Kafle said.

"Modern, rapid molecular diagnostics are being developed and validated for all major soil-borne and leafspot pathogens affecting Australian cotton production (including the new production regions in northern Australia) to reduce the time for accurate disease diagnostics and increase the effectiveness of disease management strategies."

Isolates of various pathogens will be stored and pathogenicity assays will be conducted to confirm new and emerging pathogens. The isolates will be available for future genetic diversity studies, pathogenicity tests and population genetics studies.

Dinesh will also look into novel methods of disease detection. Spore trapping in collaboration with the South Australian Research and Development Institute (SARDI) is being investigated as a tool for detecting leaf spot pathogens of cotton and the novel *Eutypella species* which cause reoccurring wilt.

"Spore trapping is used to capture airborne spores, primarily for monitoring and detecting fungal diseases in crops, allowing for early intervention and preventative measures," Dinesh said.

Through the ACDC, a national collection of all pathogens of cotton in Australia is being established. This collection is crucial for understanding the evolution and spread of existing and new pathogenic strains and for screening cotton

## Big four fungal pathogens in focus

"Through the ACDC, we will develop genomic resources for *Berkeleyomyces* and other emerging fungal pathogens such as *Corynespora, Eutypella* and *Ramulariopsis* which (respectively) cause target spot, reoccurring wilt and Ramularia leaf spot," says Dr Alexandros Sotiropoulos, who is leading the research for the ACDC.

Studying the genomes of these fungi will aid the development of tools that can be helpful in various ways and include:

- Accelerating disease diagnostics.
- Characterising new fungal strains.
- Understanding the evolution of fungicide resistance.
- Comprehending virulence patterns, with the potential future host jumps or expansion to new plant hosts, which could be triggered by their survival pressure during off season.

These new genetic resources will help crop managers make more informed decisions to minimise disease pressure, tailored to each situation. This may include avoiding growing or rotating cotton near or in fields with specific plants, alternate use of fungicides, avoiding specific cotton lines, and potentially facilitating breeders to create new cotton lines resistant to various fungi in the future.

**Target spot**

The fungus *Corynespora casiicola*, causing target spot, is an emerging pathogen of cotton in Australia. Distributed worldwide especially in subtropical and tropical areas or greenhouses, it infects multiple plants of interest such as rubber tree, tomato, cucumber, tobacco and soybean. The expansion of cotton and increased rainfall in the tropics could lead to a wider spread of this pathogen and intensify its impact.

**Reoccurring wilt**

Species of *Eutypella* are emerging as pathogens causing reoccurring wilt. Initially reported in Qld in 2021, it is now also found in NSW.

**Grey mildew**

Grey mildew or Ramularia leaf spot, caused by *Ramulariopsis* species, is another emerging disease that is posing a threat in tropical regions. It has been detected in cotton at Katherine in the NT and confirmed in Kununurra, Western Australia and central Qld. The expansion of cotton in the tropics, along with climatic changes in other growing regions can influence the spread and damage of this disease.

**Black root rot**

Black root rot is a serious seedling disease caused by the soil-borne fungus *Berkeleyomyces rouxiae* (formerly *Thielaviopsis basicola*). It has severely impacted growers in Southern NSW. However limited information and genetic resources are available to help defend against this pathogen.

**For more**

**Dr Alexandros Sotiropoulos**
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germplasm for broad-spectrum disease resistance.

Led by UniSQ's Dr Cassy Percy, the collection will provide valuable resources for creating reference genomes to identify strain-specific diagnostic markers for rapid disease surveillance, understanding pathogen population dynamics and the evolution of new strains.

Cassy is also overseeing the collection of plant varieties or other host organisms with known resistance or susceptibility profiles to different strains or races of a specific pathogen. This information is not currently available for all key pathogens, and information on the host range of cotton pathogens is incomplete.

"This information is crucial for identifying and characterising unknown pathogen strains, understanding their virulence patterns and developing effective disease management strategies," Cassy said.

"It will improve the capacity to develop resistant cultivars and phenotype key pathogens and Australian cotton growers will benefit from tactical disease management strategies developed in this project."

### Monitoring genetic diversity

UniSQ's Dr Alexandros Sotiropoulos is monitoring pathogen genomic diversity to rapidly monitor and compare changes in pathogen migration patterns and adaptation to alternate hosts, new cotton lines and the environment, identifying diverse and virulent pathogens.

Creating population genomic resources for cotton fungal pathogens will make it easier to understand virulent fungal populations emerging in a region and create datasets of pathogen genomes for comparisons in pathogen diagnostics in the future.

In a separate study, Alexandros will hone-in on key fungal pathogens (see breakout story).

### Disease dynamics

Many cotton diseases are caused by multiple pathogens, contributing to complex disease dynamics and hence management in the field.

"Co-infection complicates disease management strategies and often leads to more severe symptoms and higher seedling mortality rates, which directly impacts yield," says UniSQ's Dr Sadegh Balotf.

## CottonInfo links R&D to growers and consultants

CottonInfo are supporting and working closely with the ACDC to ensure that the science being conducted by researchers is effectively extended to growers. To help achieve this, they are providing a regional perspective of disease issues, facilitating the collection of samples to support research into changes in pathogenicity, and continuing on-farm trials to investigate potential management practices that may reduce disease incidence and severity.

"Disease is one of our highest priorities this season, with activity delivered by CottonInfo Biosecurity and Disease Technical Lead Sharna Holman and our Regional Extension Officers (REOs)," says CottonInfo Program Manager Janelle Montgomery.

"Our REOs are undertaking different on-farm trials, with some already underway.

"In the Namoi, REOs Bob Ford and Blake Palmer have developed on-farm farming systems trials in collaboration with local growers to assess the effect of different practices and rotations on Verticillium wilt, while in the Gwydir, REO Greg Bramley will have a trial to better understand how different soil ameliorants and the biological product Sero-X impact this disease."

The CottonInfo team will work with crop managers to ensure high-quality disease samples are submitted for diagnostics. The benefits are two-fold as correct identification supports a grower's decision-making and appropriate management, and the samples contribute to the ACDC-curated reference collection and support the detection of shifts in pathogenicity over the long-term.

"Taking high-quality samples for diagnostics is essential because it enables researchers to accurately isolate the pathogen of concern," Sharna said.

"This information, which is provided back to growers and consultants, enables them to make informed management decisions which can vary depending on the disease, particularly for post-harvest management and non-host rotation crops.

"The CottonInfo team will use a mix of approaches to help ensure disease research information gets out to growers and the industry, including the updating of CottonInfo's online resources, regionally-focused newsletters and local face-to-face meetings.

"We also recognise there are lots of disease research activities underway such as the Cotton Seed Distributors' (CSD) Richard Williams Commercial Research Initiative which is working with Crown Analytical Services. As well as collaborating on regional extension, CottonInfo will bring organisations together in October to further this collaboration and coordination."

Addressing issues as they arise is also a core remit for the ACDC and CottonInfo, according to CRDC Senior Innovation Broker Susan Maas.

"CottonInfo really boosts the capacity of the ACDC to stay connected to regional disease issues and considerations and in getting timely advice out," she said.

"For example, in early September, based on enquiries about boll rot, Central Qld REO Tami Buranda organised a visit from Qld DPI scientists to meet with growers and consultants.

"The REOs are also running trials with growers, which means they get to see the results first-hand in relation to problems the growers themselves have highlighted – results they can then share

"I'm working on a project that will equip Australian cotton growers with evidence-based, practical insights on how these pathogens interact and contribute to disease severity, enabling more informed decisions in managing complex disease threats, and providing the tools necessary to detect and quantify co-infection."

### Searching for solutions

Work is underway identifying and evaluating new fungicidal compounds and plant defence activators (natural or synthetically substances that enhances a plant's own immune response to pathogens) for their potential use in Australian cotton systems. Drawing on both national and global analyses, the project aims to expand the current disease management toolkit by testing novel actives and understanding their efficacy in local and international cotton production contexts.

This work is critical in addressing the industry's limited options for disease control.

Professor Levente Kiss, the Director of Centre for Crop Health at UniSQ is leading the initial review and horizon scan including engaging with commercial and research organisations with potential solutions. This will then inform strategic screening, firstly in lab and then in the field.

***"This work is critical in addressing the industry's limited options for disease control."***

"We are really keen to hear from growers, consultants and industry about ideas on what should be included in the review," Susan said.

"I don't think we are going to find a silver bullet to a disease, but it would be good to have some tools to support a farming systems integrated disease management approach.

**For more**

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with other growers in their valleys.

"We are also going to build on past and ongoing research to get to the heart of long-standing issues such as black root rot for southern growers.

"This will involve working with Southern Valleys REO Kieran O'Keeffe, Macquarie REO Rochelle Field and local agronomists so we can combine practical, current, on-the-ground knowledge with academic pathology.

"We know it is important to have capacity in the south to manage black root rot and the ACDC is in process of contracting a southern focused disease project."

CottonInfo is developing a suite of practical, ready-to-use resources focused on the industry's key diseases of concern to highlight where research is currently underway in different ACDC projects. They are also sharing current best management practices to reduce the incidence and severity of cotton diseases. Most recently, CottonInfo hosted a disease webinar to update growers and consultants on the projects and research trials planned for this season. Growers and consultants that missed the webinar can catch up online.

Understanding complex disease dynamics will give growers better management options.

**For more**

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**CottonInfo and ACDC webinar:** www.cottoninfo.com.au/events/cottoninfo-and-acdc-webinar

Newly appointed CottonInfo Technical Lead for digital agriculture/agtech Quentin Feery-Lawrence with early career researcher Harry Gaston at Emerald. Quentin and Harry are both working on the Future Cotton project.

# Major project announced, breaking new ground for growers

**QUEENSLAND'S** $1 billion cotton industry is set for a major boost, with a new multi-million-dollar partnership set to supercharge cotton innovation, increase grower support and help drive sustainable growth.

The initiative – Future Cotton: Innovation and Impact for Sustainability, Biosecurity and Growth – is a four-year strategic partnership between CRDC and Qld DPI.

Future Cotton aims to grow on-farm cotton productivity through targeted research, development and extension (RD&E), and will work to address the cotton industry's most pressing challenges – from pest and disease management to emissions reduction, ag tech adoption and climate resilience.

Importantly, the project increases research and extension capacity across key cotton regions of Goondiwindi (Bigambul country), Emerald (Gayiri country) and Toowoomba (Barunggam country), with a team focused on delivering outcomes for the entire industry. This team will work closely with CottonInfo to support the adoption of innovation and deliver practical guidance to growers.

Qld Minister for Primary Industries, the Hon. Tony Perrett MP said the partnership reflected the Government's commitment to working alongside Queensland's cotton industry to ensure its future prosperity.

"Cotton is one of Queensland's most valuable and innovative agricultural industries, employing thousands of Queenslanders and producing 40 per cent of Australia's cotton," Minister Perrett said.

"With a gross value production (GVP) of over $1 billion, we know the cotton industry will be a key player in the government's goal to achieve a farm gate output of $30 billion by 2030.

"The Future Cotton partnership is about investing in industry-led programs to increase sustainability and support our growers to get the best outcome for their crops every year.

"This partnership backs our growers with the science, skills and tools they need to improve performance, tackle emerging threats, and lead the way on innovation, sustainability and ag tech adoption for the future."

CRDC Executive Director Allan Williams said the partnership was about "turning research into results" and would deliver practical on-farm outcomes while strengthening the cotton industry's capacity to lead positive change.

"This partnership with Qld DPI enables us to deliver focused, regional support to growers through expert technical leads, strategic research capability, and better extension," Allan said.

"We're tackling key issues like insecticide resistance, sustainable pest management, and adapting agronomic practice to improve climate resilience in a way that's fully integrated across the whole cotton system."

The Future Cotton partnership builds on decades of successful collaboration between CRDC and Qld DPI, which has delivered substantial yield increases in Central Queensland, driven the expansion of cotton across northern Australia, and improved on-farm pest management nationally.

The Future Cotton program also supports the delivery of CRDC's Strategic

Plan, Clever Cotton (which aims to deliver $1 billion in additional value to the cotton industry through research, development and extension), grower-led initiatives focused on reducing emissions, and CRDC's long-term goal of establishing a low-carbon cotton production system fit for a changing climate.

### Lead scientist taking the reins

The collaboration is being led by highly respected industry research scientist, Qld DPI's Dr Paul Grundy. Based in Toowoomba, he is also CottonInfo's Technical Lead for Integrated Pest Management (IPM) and Northern Australia.

Paul has been involved in a broad range of pest management and agronomic research projects for over 25 years including growing cotton in tropical climates, silverleaf whitefly management and tailoring cotton production in Central Queensland to get the best out of a sub-tropical climate. He has authored recent CottonInfo industry guidelines for optimising defoliation, northern cotton production and early season pest management.

CRDC Senior Innovation Broker Susan Maas, who is based in Emerald, brought the Future Cotton collaboration proposal together. She also has an in-depth understanding of the cotton farming system and the people who grow it.

**Dr Paul Grundy is leading the Future Cotton project, putting his multi-disciplinary skills to work across several research areas.**

Susan has been involved in the industry and CRDC for well over a decade, and her knowledge of past CRDC-supported research was drawn on to build the new project – incorporating many research and capacity angles and increasing RD&E resourcing to better serve growers in key regions. Through Susan's cross-disciplinary approach, Future Cotton will also collaborate with CRDC-supported initiatives such as the Australian Cotton Disease Collaboration (ACDC), the Cotton Low Emissions Intensity Farming Systems (Cotton LEIFS) project, and research focused on machine learning and sensing with the University of Southern Queensland's (UniSQ's) Centre for Agricultural Engineering.

> ***"The other major driver was capacity – making the most of the incredible researchers we have, while also bringing more capacity into the industry"***

She says there is a lot of value to the industry in developing a farming systems approach to research.

"I thought we should overlay these traditionally 'different' research areas because farming is a system and research should be focusing on it as one system," Susan said.

"The other major driver was capacity – making the most of the incredible researchers we have, while also bringing more capacity into the industry."

This approach will bring efficiency to the research.

"For example, the implications for soil pest, disease and canopy management will be considered as part of farming systems research focused on low emissions farming systems (nitrogen and rotations), while having CottonInfo built into the project will ensure that there is clear pathway to extending information," Susan said.

"In keeping with this approach, Future Cotton will involve practical on-farm research through on-farm trial sites, where multiple experiments covering different aspects such as disease, irrigation and carbon can be overlaid.

"The project is also being rolled out over four years (instead of the typical three years) to accommodate complex farming systems research outcomes as well as encourage and maintain core capacity."

## Key activities of Future Cotton

1. CottonInfo Technical Leads for IPM, Northern Australia, disease, biosecurity, and digital agriculture/agtech.
2. Entomological research concentrating on silverleaf whitefly resistance testing, pesticide impacts on natural enemies, and soil pest control, which will inform the TIMS Insecticide Resistance Management Strategy (IRMS) processes, support IPM decision-making, and address emerging issues related to regulatory cancellation of some pesticides.
3. Development of innovative agronomic systems to improve cotton production and resilience by exploring alternative production techniques and refining canopy management strategies.
4. Grower-led initiatives to select, demonstrate and validate agronomic and farming system tactics to reduce greenhouse gas emission intensity compared with standard practices across different environments.
5. Integration with CRDC's ACDC program for better disease management.
6. Creation of best practice information resources for the industry, including podcasts, video content and annual updates to CottonInfo publications.
7. Enhanced RD&E capacity, with co-investment in additional personnel across Qld to respond to emerging crop protection, biosecurity and farming system challenges.

# Capacity at its core: early career researchers on board

**THE** Future Cotton collaboration has increasing RD&E capacity in the regions as a key driver, and while this project has just been announced, the recruitment and onboarding of new team members has already begun. This includes recruiting and stationing research scientists and technical support staff in Goondiwindi, Emerald and Toowoomba. This provides a direct link between researchers and growers in those regions. They'll also be involved in experiments and trial sites in the regions in collaboration with other major CRDC investments.

This will include on-farm carbon research for Cotton LEIFS and collaborate with pathologists working within the ACDC initiative.

Future Cotton lead Dr Paul Grundy says these scientists and technicians will be working with growers who would like to explore and test farming system tactics to potentially reduce emission intensity compared with regular practice. For example, improving nitrogen use efficiency through testing the use of enhanced efficiency fertilisers, more tactical in-crop application of nitrogen or farming system adjustments to make greater use of legume cover or rotation crops.

Improved nitrogen use efficiency may also provide benefits for management of disease such as Verticillium wilt which will also be a focus within this work. Ultimately, the aim is to explore whether productivity can be maintained or improved while making more efficient use of inputs. Better disease management would help with the productivity side of the equation.

"Growers who want to be involved will be able to work with the new staff to benchmark and compare the impact of these tactics against their existing practices from a productivity and emissions perspective at the paddock level," Paul said.

"As markets and banks require more information about the emissions intensity of cotton produced this will be a good opportunity for growers to explore their options and have the outcomes assessed."

Future Cotton is also supporting early career researchers, including Qld DPI graduate research agronomist Harry Gaston at Emerald. Harry has a broad agricultural background and a passion for plant science, with both practical and scientific skills. He holds a Bachelor of Agricultural Science and has also worked within the ginning side of the industry. Harry has been working on Sunn hemp trials aimed at managing reniform nematode, a key pest in central Qld.

**Early career research Harry Gaston and long-term industry research scientist Gail Spargo, both of Qld DPI have already been working together on projects around the Central Highlands.**

Meanwhile CottonInfo also has a new Technical Lead role in digital agriculture/agtech, with Qld DPI's Quentin Feery-Lawrence in this position, based in Emerald. Since starting in the role, Quentin has already been out and about talking to growers in the field about everything agtech.

The Future Cotton project is a big win for growers in these regions, research capacity and the greater industry.

"To bring new research scientists and technical specialists into Goondiwindi, Toowoomba and Emerald was a clear aim of this project," says CRDC's Susan Maas.

"A really important part of the partnership is the ability to bring more skilled people into the industry to serve growers, while better utilising the knowledge of the research scientists who already provide world-class research to our industry.

"We constantly need new researchers to come through and become leaders in the industry and to build capacity in people who can do farming systems work.

"I'm really excited to have these people on board and on the ground."

Along with Paul Grundy, familiar Qld DPI staff are also involved in the project, including entomology researchers Dr Jamie Hopkinson and Jacob Balzer, CottonInfo Biosecurity and Disease Technical Lead Sharna Holman, Senior Development Extension Officer Tonia Grundy and Emerald-based technician Gail Spargo. Qld DPI Biometrician Kerry Bell also joins the team along with Assoc Professor Alison McCarthy (UniSQ) to further validate new technology for canopy management in cotton.

"The cotton industry was built on the best of the research community over the past 30 years. If we want to continue to be the envy of the cotton producing world in terms of the standard of our R&D we need passionate researchers – and through Future Cotton we hope to achieve this."

**For more**

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# Candid conversations amplify growers' voices

**GOOD** attendance and engagement from growers and the wider industry has provided Cotton Australia and CRDC with important early guidance on the future direction of the *my*BMP program, traceability, the CRDC-led cotton industry data platform and human rights.

The Growers' Voice and Carbon Chat Tour kicked off in Central Qld in late July with events at Banana and Emerald (both Gayiri country). The roadshow then moved to the Macquarie, Southern Valleys, Upper and Lower Namoi, Walgett, the Macintyre and Border Rivers, finishing up in the Darling Downs of Qld in mid-September.

The tour was an initiative of Cotton Australia and CRDC working with Cotton Grower Associations to discuss and receive grower input into the *Strategic Roadmap for Australian Cotton*. The Roadmap is a detailed plan to ensure the Australian cotton industry remains competitive and a supplier of choice in a changing global fashion and textiles market. The Roadmap covers five key topic areas: traceability, industry data, sustainably-certified cotton/*my*BMP, human rights and Australian cotton promotion. These topics were used for the basis of the discussions, held after presentations from Cotton Australia CEO Adam Kay on traceability, CRDC Executive director Allan Williams on the *my*BMP review and Cotton Industry Data Platform and Cotton to Market Lead Brooke Summers explaining the finer points of human rights and the relevance to Australian growers. Growers also had the opportunity to raise local issues directly with Allan and Adam.

***"We had candid and wide-ranging discussions about the challenges, benefits, and future direction of the myBMP program."***

The Carbon Chat component of the tour was presented by CottonInfo Energy, Climate and Carbon Technical Lead Jon Welsh, offering insights into the science, economic, market access and policy angles of carbon, along with identifying gaps in grower resources and information.

"We're really encouraged by the feedback which will be incorporated into our plans as the Roadmap becomes operational. It's fair to say that we're still in a research and discovery phase as we work out the best investments and direction for the industry and we're committed to making the process as collaborative as possible," Adam said.

"The growers involved in the workshops were positive, engaged and had excellent insights into what may work and not work for them and their farming operations.

"This is just the start of the consultation process. We are determined that the Roadmap is co-developed with our growers and really appreciate those that came along to share their thoughts."

A core theme is the need to ensure any value proposition is clear, additional administration burden is limited and that there is supply chain transparency in terms of the premiums available for sustainable, traceable cotton from Australia.

## *my*BMP review

As a part of the Roadmap development, CRDC commissioned a review to assess *my*BMP's effectiveness, relevance and future fitness, and outline how the industry can best meet new and emerging requirements for demonstrating sustainability credentials. The review, once complete, will include recommendations for improvements to the program, potentially including updates to its structure, content, and reporting mechanisms.

"We had candid and wide-ranging discussions about the challenges, benefits, and future direction of the *my*BMP program that we've taken on board," Allan said.

"We heard that *my*BMP is valued for helping growers meet legal and regulatory requirements, offering protection in areas like liability insurance and environmental compliance.

"We also heard some of the barriers to adoption, including a lack of financial incentive and competing demands for time, making it harder for growers to turn their attention to *my*BMP."

Some of the other barriers raised by growers were poor internet connectivity, mental fatigue and burdensome final certification components.

"At Emerald, WHS was a major motivator for growers for continued participation in *my*BMP. Growers cited

improved safety practices, staff inductions, and better retention through the program. One anecdote highlighted a grower avoiding prosecution due to documented WHS procedures under *my*BMP," Allan said.

"However, there's gap between maintaining the program's rigour and making it accessible enough to support broader market access and environmental, social and governance (ESG) goals.

"Many growers feel that while *my*BMP has been a longstanding program (20-plus years), its economic value has diminished, especially compared to Better Cotton."

The opportunities such as aligning *my*BMP with other programs like Better Cotton was viewed by growers as a smart move to streamline certification, along with a call for greater recognition of existing compliance efforts and for traceability systems to better reflect the realities of cotton production. A need for a unified farm-level BMP that covers cotton, cattle and grains, rather than separate programs for each commodity was also raised.

## The cotton industry data platform

While external stakeholders regularly highlight the need for impact data — such as irrigation efficiency and carbon footprint — to meet evolving sustainability and ESG goals, growers emphasised the importance of the data they collect also benefiting their operations and supporting their decision making.

The good news is that the industry data platform is being designed to solve issues growers currently face around collecting, processing and utilising their data to improve the economic and sustainability outcomes of their operation.

"There's interest in a flexible, agnostic data platform that could support multiple certification pathways and reduce duplication of effort, automate data collection and integrate with existing systems (e.g. John Deere, AgWorld) to reduce double handling," Allan said.

"There's a strong desire for automated data collection to reduce manual input and improve accuracy.

"The good news is that the cotton industry data platform promises voluntary participation, secure data handling, and analytics capabilities that will be able to help growers meet market demands for traceability and sustainability reporting, potentially unlocking premiums.

"Growers also see value in mapping fibre quality and yield at the field level, but current systems are cumbersome.

"Automating data collection across farms could unlock meaningful insights. The platform we are developing for the industry will feature automated data collection and integration and allows growers to generate tailored reports (e.g. sustainability, water use, emissions) which is seen by growers as highly valuable, especially for market access and benchmarking."

As expected, ensuring data integrity and privacy were paramount considerations raised by growers and attendees at the workshops, with concerns that aggregated national data may misrepresent local realities, leading to inappropriate comparisons or policy decisions.

**The small group settings gave growers and others the opportunity to discuss local issues directly with CRDC and Cotton Australia.**

## Engagement across all discussion topics

In general, growers were engaged in all topics on the agenda, with an acute awareness that they are operating in a constantly evolving marketplace.

"It's clear that through the stakeholder engagement work already done, and also growers and industry being more exposed to global issues, that there's strong support for the need to make sure we are ready for a changing global and Australian environment," Brooke said.

"Growers are generally surprised to hear that we don't have a connected, integrated traceability system like our competitors and like the other cotton sustainability programs in the market and feel we needed to move quickly to catch up on that topic.

"There's been great feedback about the value proposition versus who pays for traceability and growers felt that brands and merchants were those currently benefiting and so should be co-investing in this."

In terms of human rights, there were a number of scenarios put to the participants which prompted really interesting discussions about what does or doesn't constitute human rights issues and what some of the gaps in our data and verification may be. This topic will be included in the review of *my*BMP to ensure the social compliance aspects of cotton production in Australia are properly covered.

"While we know that we are low risk for human rights violations here we still need to be collecting the right evidence to verify those claims. Global businesses including fashion brands and merchants are adopting due diligence approaches, and this will soon be mandated for every product sold in the EU," Brooke said.

"Treatment of migrant workers, access to affordable childcare, working outside in overly hot conditions and minimum working ages are all relevant.

"Just the fact that our farmers are so open and willing to talk about these topics is a testament to our industry, its transparency, and its ambitions to be the best we can be.

"We are a global industry and human rights in textile supply chains is a huge issue for cotton across the value chain."

**For more**

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# Breaking down carbon in the best way

**THE** concept of 'carbon' can be enough to make your head spin, let alone if other words like sequestration, emissions factors, cycling, markets, positive or negative are added after it!

Thankfully though, what this all means to a grower, to their bottom line, long-term soil health and the environment has been made a lot simpler.

CottonInfo Carbon Technical Lead Jon Welsh has been sharing his knowledge around the carbon balance in the cotton landscape through the Growers' Voice and Carbon Chat Tour. It's been an opportunity to share critical information to growers from an impartial perspective, and also better understand where they need help to take advantage of this information to manage their farms with better economic and sustainability returns.

Jon says what stood out to him was the level of interest from participants at the post-event gatherings for information sources and material based on his presentation.

"Cotton growers have a strong appetite for independent industry advice on carbon and sustainability," he said.

"The majority of growers are really interested in understanding carbon, markets and incoming policy settings, they're just unsure where and who they should be getting the information from.

"The information I share is based on peer-reviewed science, recent industry research related to broadacre cropping systems and agronomic information. presented from a neutral standpoint."

For CRDC Innovation Broker Nicola Cottee, who oversees CRDC's investment in carbon and emission-related projects, Jon's involvement in the tour spells opportunities for growers.

"Jon's interactions with growers gives us guidance on where to boost industry capacity and extension," Nicola said.

"We now have a better gauge of where growers are on their carbon journey, the types of information they are wanting, and how they like it delivered.

"I've had a lot of feedback from growers around understanding the value proposition for thinking about carbon or investing in emissions reductions. They want to know what their options are, what they need to do, why and when.

"I'm really looking forward to the Cotton Low Emission Intensity Farming Systems (LEIFS) case study farms getting up and running."

Cotton LEIFS is a project that is working directly with growers to calculate and report the emissions intensity of their cotton and support them in planning and implementing emissions reduction strategies. It is partnering with the NSW DPIRD Farms of the Future project and Qld DPI and CRDC's Future Cotton project (see story page 8) to demonstrate technology to monitor crops, inform decisions and reduce greenhouse gas emissions (GHG).

"There are opportunities for growers who would like to be involved, including trialling emissions reductions technologies on-farm in a low-risk environment, which could be particularly important for nitrogen fertilisers, where risk is such a big driver for decisions," Nicola said.

"We now have a new scientist in Goondiwindi as part of the Future Cotton project who will be working on the cotton LEIFS project."

In addition to on-farm sites, research demonstration hubs will be near Narrabri (Kamilaroi country), Trangie (Wiradjuri country), and in southern NSW (location to be confirmed). These research hubs will be used to demonstrate emerging GHG emissions reduction strategies.

"I think this project will go a long way to helping growers not just understand, but implement strategies they know will work," Nicola said.

"In the meantime, we will look at how we can provide more extension around carbon and emissions."


MELANIE JENSON

**Jon Welsh pictured with grower and fellow economist at Ag Econ, Janine Powell, have undertaken multiple studies into on-farm efficiency measures to reduce greenhouse gas emissions, which were discussed on the Growers' Voice and Carbon Chat Tour.**

## Reducing emissions

Jon's 'what can be done' list:

- Add/integrate solar to a grid or diesel powered pump. Deep bores that require long pumping periods into water storage also offer high use and fast payback periods.
- Consider enhanced efficiency fertiliser, as they can reduce nitrous oxide emissions by 31 per cent and the cost margin with urea is closing.
- Mitigate your soil compaction to improve water infiltration, yields and improve nitrogen use efficiency.
- Improve in-field drainage to reduce waterlogging, yield penalties and denitrification events.
- Recycle tailwater to re-use soluble nitrates on adjacent fields.

**For more**

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# Could nitrogen risk insurance be a viable option for cotton?

Optimising nitrogen (N) fertiliser use presents a significant opportunity for productivity and profitability for Australian cotton growers, with additional benefits in reducing greenhouse gas emissions (GHG).

Currently, N fertiliser applications make up two-thirds of the carbon emissions in the production of cotton fibre at the farm gate. As the industry looks to improve N use efficiency (NUE), it's obvious that the path to optimising N supply to cotton crops through both fertiliser N and soil mineral N is not straightforward.

CRDC Innovation Broker Dr Nicola Cottee oversees investment in research aimed at giving growers the knowledge and practices to improve N use efficiency (NUE), while at the same time reducing GHG. She says while much research has focused on giving growers the tools to reduce fertiliser N use, growers are calling for alternatives.

"Growers have told us that asking them to reduce N rate is not helpful – it's actually really hard to know precisely how much N will be required to optimise crop yield and profitability at the time you actually have to make the decision about N rates," Nicola says.

"As a result, we are investigating ways they can increase NUE in a safer way by mitigating the risks associated with reducing N rates.

"This has led to our investment in a project to explore whether 'N risk insurance' based on a product from a commercial provider available in the sugar industry has a fit in cotton production."

**It can be difficult to know precisely how much nitrogen will be required at the start of the season to optimise crop yield and profitability come harvest. CRDC is investigating methods of improving nitrogen use efficiency without jeopardising yield by mitigating the risks associated with reducing N rates.**

## A different type of insurance

Unlike traditional 'indemnity' insurance (home, car, insuring crops against fire and hail), where an assessor comes out and bases your payout on damage, N risk insurance is calculated based around the value of different parameters relating to the N risk – things like rainfall, temperature, fertiliser application and soil type.

"The problem is that these parameters are difficult to define – as they're inputs rather than damage/outputs – which is why we need science to work out what the appropriate parameters could be for cotton," Nicola said.

"However, N risk insurance models will be much easier and quicker to pay out – as it is determined by the inputs you already know – how much N you put on, how much rainfall there's been, what the air temperatures were – so don't need an assessment of damage.

The project has initially been investigating ways to better understand grower's decision-making processes related to N fertiliser and gather feedback on various strategies for optimising N supply while mitigating the risk of yield loss.

For the first stage of the project, CSIRO social scientists Dr Michelle Miller and Dr Zelalem Moti held meetings with growers, managers, and consultants to gather information around N use decisions and the potential of a novel insurance idea. Participants included family and corporate farms as well as a mix of roles within farms with the aim of gathering a range of perspectives.

Participants in this research emphasised that the path to optimising N is not straightforward owing to a number of complexities that must be negotiated to get N rates 'just right' in line with the Five Rs: right fertiliser, right rate, right time, right place, and right irrigation management.

## Deciding the rate

Along with their experiences and knowledge, to achieve target yields growers and consultants consider yield potential and soil testing results to calculate N application rates. N fertiliser may be split (applied more than once), and subsequent applications tweaked in response to in-crop testing, conditions and events as the season unfolds. In managing N application to achieve target yields,

growers look to strike a balance between logistics, labour, application methods, irrigation and rainfall timing, and any losses they estimate.

Other variables also factor heavily in N-related decisions, such as rotations, disease risks, hectares under crop, day degrees and overall seasonal conditions. While there is an economic risk with too little N, there are also production risks with too much N and these risks vary based on location and conditions.

There were a small number of growers in this study who are experimenting with organic forms of N, longer rotations, and farm design and they reported very different N use practices and approaches to risk. Regardless of grower or farm segmentation, the complexities related to N mean that optimising N fertiliser management can never be as simple as reducing applied N.

The research that Michelle and Zelalem are conducting factors in this complexity. Their research sees changing N use as a systems challenge that requires a holistic approach combining complementary technologies and social changes through a supported transition process. The insurance idea that they shared with participants is just one of multiple potential options that could help support growers to experiment to optimise N supply.

The idea for using insurance as a means to de-risk N supply optimisation in cotton draws from a similar effort in sugarcane research.

Project lead Dr Peter Thorburn worked with sugarcane farmers over several years to develop an insurance concept to protect against the risk of yield and income loss related to reducing N-fertiliser application. The resulting product – N risk insurance – has been available in the Australian sugar industry from a commercial provider since 2022 (see website below).

"Whilst the insurance idea for cotton is still in concept stage, the novel approach intrigued participants," Michelle said.

"Understandably there were many questions about how the product would work. Just over half (57 per cent) of participants expressed support for the idea that an insurance product could help de-risk experimentation with optimising N supply.

"Three-quarters of participants could see some form of potential benefit, regardless of whether they were supportive or sceptical of the idea.

"The most common concern expressed was that pressure on N-fertiliser use is potentially in conflict with yield maximisation (35 per cent)."

The interviews included discussion of the attractiveness of a range of alternatives, like existing or new market-based schemes, potential regulation, management (like rotation, splits etc) and extension. This research and other research, for instance regarding policy mixes, suggest that an integrated set of initiatives are most likely to be effective in promoting N efficiency and facilitating experimentation to achieve optimisation.

***"Regardless of grower or farm segmentation, the complexities related to N mean that optimising N fertiliser management can never be as simple as reducing applied N."***

"Participants reflected that the cotton community has fostered a strong social and collaborative culture, driving progress in water use efficiency and reducing pesticide use," Zelalem says.

"Many now see improving NUE as their next key challenge. Discussion of options also broadened the insurance idea beyond just commercial application, and the next phase of the project will take into consideration a range of ways the insurance idea could be interpreted.

"The findings of this project contribute insights to innovative risk management and offer practical actions for scientists, policy and industry actors seeking more sustainable N use for a reduced environmental footprint."

The researchers were keen to convey how grateful they are to those who have participated in their project.

"In addition to the support of the CRDC and CottonInfo, this research is made possible by the contribution of growers, managers, and consultants who have generously shared their time with the team," Peter said.

"It's not too late for growers interested in discussing their views on optimising N-fertiliser with Michelle and to contact us."

**For more**

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**Nitrogen risk insurance in sugarcane**
bit.ly/4IRRT5r

MELANIE JENSON

# New industry resources give growers impartial information and advice

Nature repair, biodiversity, natural capital, environmental markets... sometimes these topics can be confusing and growers are finding it time consuming and difficult to get the independent advice they need in a one-stop-shop.

To assist growers, CRDC and CottonInfo have supported the development of resources for growers with impartial objective recommendations to help them navigate products in the interlinked realms of biodiversity, natural capital and environmental markets. The online resources provide guidance around resources, how to access them, and steps toward implementation and usage.

"Understanding a farm's biodiversity today can help growers prepare for future changes, navigate evolving policies, meet supply chain expectations, and respond to sustainability trends," says CRDC Innovation Broker Stacey Vogel, who has led the development of these new resources.

"Growers are telling us they need neutral and objective advice on how to start taking advantage of environmental markets and the best tools for the job.

"These new online resources have links to the best websites and resources to save them time and money, and offer clear advice to support them."

## Assessing biodiversity

Key biodiversity indicators on cotton farms include native vegetation, land cover and the presence of both native and invasive species. There are many tools available to help assess biodiversity, from free online platforms to detailed paid services. While the best choice depends on individual needs, to explore a farm's biodiversity data and start mapping, a great starting point is PLANR.

PLANR (Platform for Land and Nature Repair) is a free, government-supported mapping tool designed to help growers participate in Australia's Nature Repair Market Scheme. It can help users understand their farm's current biodiversity, track its changes over time, and make better decisions that open up new market opportunities.

## Tracking natural capital

Consistent natural capital data helps growers stay ahead of evolving regulations and demonstrate responsible land management. Many growers are already making significant contributions to environmental sustainability. Two key resources are CSIRO's Natural Capital Handbook and La Trobe University's Farm Scale Natural Capital Accounting Methods.

Natural Capital Accounting (NCA) helps track and value those efforts. It's a structured way to measure biodiversity and other natural resources, such as soil and water, at the whole-farm level.

Compared to simpler tools like PLANR, NCA offers a more detailed, whole-farm assessment, connecting land use, management and biodiversity outcomes.

By adopting NCA, growers benefit from being able to measure and monitor environmental assets and biodiversity over time, understand how management practices impact natural systems, and see how ecological health contributes to farm productivity. Growers can use NCA to understand how natural assets, such as soil, water, and biodiversity, contribute to their farm's resilience and productivity. It supports decision-making and provides evidence of environmental performance. Key benefits include:

- Measuring biodiversity and other natural capital, like carbon
- Understanding environmental risks (e.g. water shortages, degradation)
- Identifying new market opportunities (e.g. carbon or biodiversity credits)
- Preparing for sustainability reporting (e.g. Taskforce on Nature-related Financial Disclosures – TNFD).

## Environmental markets

Environmental markets are still developing, but they may offer new opportunities for cotton growers. The *Introduction to environmental markets* resource is a grower's guide to environmental markets and how to measure what matters. It gives examples of tools that can support biodiversity measurement and market readiness.

Environmental markets assign financial value to activities that benefit nature, such as restoring habitat, planting native vegetation or improving ecosystem health. Outcomes may include enhanced carbon storage, increased habitat for threatened species or improved farm resilience. Environmental improvements may attract funding from government programs or private buyers.

While these markets are still developing and trade volumes are relatively low in some areas, they offer growing potential as governments and buyers increasingly seek ways to support measurable environmental outcomes.

The CottonInfo resource explains types of environmental markets from government-regulated offset markets (e.g. NSW Biodiversity Offset Scheme) through to biodiversity credit schemes (e.g. NaturePlus, Nature Repair Market) and carbon markets with biodiversity co-benefits (e.g. Queensland Land Restoration Fund)

"Cotton growers already contribute to biodiversity by protecting native vegetation, managing pests sustainably, and maintaining healthy waterways," Stacey said.

"Environmental markets provide a new way to recognise, reward, and enhance these efforts.

"Environmental markets may provide an additional source of income through biodiversity or carbon credit sales and support long-term sustainability, by leaving the land in better condition for future generations.

***"Environmental markets may provide an additional source of income through biodiversity or carbon credit sales and support long-term sustainability, by leaving the land in better condition for future generations"***

"Preparation for entering these markets can also offer benefits through avenues such as improved pest control from increased native species, preparation for sustainability disclosures and maintaining market access by meeting buyer and supply chain expectations."

## Measuring for market participation

Unlike carbon markets, which use a single metric (carbon equivalents), environmental markets rely on a wider range of data. Many projects begin with satellite imagery to identify areas of potential, but participation requires accurate, on-ground ecological data, especially for species occurrence and abundance and/or fine-scale condition of habitats and ecosystems that focus on composition, structure and function – in other words, the health of a habitat for a particular species (e.g. wetlands) or an ecosystem, for example a Eucalyptus woodland.

These measures are typically gathered using government-approved survey protocols or standardised field monitoring systems such as bird surveys or vegetation condition scoring. Emerging technologies, such as passive acoustic monitors or eDNA to detect species without visual observation, however would be less time consuming and costly.

Automated biodiversity monitoring technology is being developed under a CRDC project with the University of Sunshine Coast (UniSC) and Queensland University of Technology.

"Along with these resources, CRDC is working to make biodiversity monitoring less arduous and expensive," Stacey said.

"The UniSC researchers will be back in the field later this year to deploy full-sized, autonomous acoustic monitors on cotton farms, which will be a game changer in comparison to the methods currently available." (See *Spotlight* Summer 2024-25)

**For more**

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# Cotton growers take centre stage at awards

**BROTHERS** Hugh and Jock Brownhill of Merrilong Agricultural Company have credited the knowledge of their parents and grandparents and the importance of teamwork for their recognition as the 2025 Bayer Cotton Growers of the year.

The 2025 Australian Cotton Industry Awards Dinner was held as part of the Cotton Collective in Toowoomba (Barunggam country) in early August.

As fourth generation farmers, Hugh and Jock Brownhill are part of a farming legacy that began when their grandparents moved into the NSW Liverpool Plains area (Kamilaroi/Wailwan country) to begin farming in the late 1950s. Today, Hugh and his brother Jock, along with cousins Oscar and Archie Brownhill, are Directors of Merrilong with 1200 hectares of dryland cotton and 320 hectares under irrigation.

Hugh said his father and uncle taught him everything he knows about cotton and that a focus on family and teamwork drive their ongoing success.

"We are not motivated by awards but view our nomination as a privilege in an industry that promotes our product to the rest of the world," he said.

"We have a strong team, and they are the heartbeat of our organisation. Our work colleagues are like family to us, and we communicate with them regularly to make sure we are on the same page, so that we achieve our shared goals.

"Our region is well-suited to growing dryland cotton because we have reliable rainfall and good soils.

"If we keep preserving our soil and looking after what we have with management tools, crop choice and rotation, we expect to have better yields every year, with less inputs."

The family employs an external advisory board to help make farming and business decisions which they describe as a game-changer, allowing them to focus on what's happening on farm.

## Second generation to the fore

Tyson and Rosie Armitage from Cecil Plains on the Darling Downs (Barunggam country), who manage the day-to-day operations of Wamara Farming Trust in close collaboration with parents Stuart and Maxine Armitage, were announced as the AgriRisk High Achievers awardees.

**Cotton growers Tyson and Rosie Armitage, Grace Griffiths, Hugh and Jock Brownhill, along with research scientist Dr Murray Sharman were honoured at this year's Australian Cotton Industry Awards. (Not pictured Boggabri grower Andrew Watson.)**

The Armitage name is no stranger in cotton circles on the Downs and beyond. As a second generation cotton farmer, Tyson is proud of the improvements they have made over the years particularly with their integrated pest management (IPM) efforts and water use efficiency.

"We have only sprayed for pests in cotton once in three years," Tyson said.

"We have also worked hard on water use efficiency and we have saved up to one megalitre per hectare by planting later in the season, with yields just as good, if not better."

With long-term agronomists Matthew Holding and Liz Lobsey, the Armitage's have maintained a data bank of information detailing 20 years of nutrient inputs and crop removal rates.

"This has given us the information to apply only what the crops need, avoiding overapplication," Tyson says.

"While soil tests are used, leaf tests are preferred for reliable in-season tracking and any adjustments with in-crop needs are addressed with nutrient applications as required."

Cotton Australia CEO Adam Kay congratulated the recipients and nominees, as extremely deserving given their level of commitment to the industry.

"We are seeing due recognition in these awards of the next generation of cotton growers. Both our Bayer Grower of the Year and AgriRisk High Achiever have incredible knowledge passed down from their parents, who are well-respected and awarded growers who still play a role on their farms. By doing so they continue to provide the benefits of decades of growing cotton, and the collaboration and learning that goes with it."

## Tireless effort acknowledged

The prestigious Incitec Pivot Fertilisers Service to the Cotton Industry Awardee is Boggabri grower Andrew Watson of "Kilmarnock" (Kamilaroi country).

Andrew, a former Cotton Australia Chair and the 2008 Cotton Grower of the Year, has been at the forefront of implementing industry R&D while investigating his own novel management approaches to biodiversity, pest management and water use efficiency.

Andrew is highly regarded by the Australian cotton industry for his tireless efforts at improving the reputation of cotton and his constant search for knowledge and improvement.

"He has been a leader in IPM strategies and biodiversity efforts, regeneration of native grasses and trees including a stretch along the Namoi River," Adam said.

"Andrew has also been at the forefront of water-use efficiency strategies which have been adopted over the years by many fellow growers.

"He thoroughly deserves this Award, and I know everyone who knows anything about cotton will join me in congratulating Andrew and his family."

**For more**
www.cottonaustralia.com.au/awards-recipients

# Young achiever highlights a supportive industry

**THE** CRDC-Chris Lehmann Young Cotton Achiever of the Year Awardee Grace Griffiths says she's committed to being a part of the Australian cotton industry's journey to set the global standard for cotton production.

Grace is a cotton grower, agronomist and sustainability specialist at Goondiwindi (Barunggam country) who describes Australian cotton as 'an industry like no other'. This young achiever hasn't stopped since, at 16, she began leading her family farm's *my*BMP certification. Grace is now an industry leader through several initiatives she's started up, along with roles as the McIntyre Valley Cotton Growers Association's (CGA) events manger, committee president and CRDC research priority forum representative.

"Once I became a part of the industry I knew it was where I was meant to be," Grace said.

"It is an industry like no other for many reasons, but one that has always held true in my experience is the support for young people like me.

"As a result, I have always been a passionate advocate for the industry and young people alike."

## Sharing ag's story

Grace shares her passion with people through 101 Ag Pathways – a platform she founded to showcase diverse careers in agriculture. As chair of Goondiwindi Young Guns, Grace leads a group for young professionals new to town, a place to network and make connections, giving them another reason to stay in the community that "relies on and supports hundreds of cotton growers".

Since participating in the Australian Future Cotton Leaders Program in 2024, Grace has become known for her ability to simplify the carbon conversation.

"This was my Future Leaders project that stemmed from my own experience as a grower and agronomist feeling very overwhelmed by the whole topic," she says.

"This deep dive into a rapidly evolving subject highlighted a significant knowledge gap. So now I'm working alongside industry leaders, advocating for growers in key discussions, sharing updates at CGA meetings, field days and conferences.

"I found what we needed to action was simple, that there are things we can do today on our farms to improve our carbon footprint, economic outcomes and sustainability of our industry.

**CRDC Executive Director Allan Williams and Grace at the Awards evening in early August.**

"Carbon and emissions intensity are just one part of sustainability.

"Making measurable changes to make sustainability productive is key, and by banding together and taking this on as a united front it will lift us as a whole industry."

Grace says this conversation is important because our industry is on the cusp of a new era, one defined by accountability, climate targets and increasing public scrutiny.

"As expectations around environmental performance and ethical production grow, our social licence to operate will become more important than ever," she said.

"We must ensure growers are not only part of the sustainability conversation, but ahead of it.

"This means sending the message and helping with streamlining and consolidating field-level data, accurately recording greenhouse gas emissions, and adopting practical technologies to reduce our environmental footprint.

"When the questions come about how we grow, what we use and what impact we have, from any market, we are ready.

"We have the chance to lead, to innovate, and to show the world that Australian cotton isn't just a high-quality fibre, it's produced by a forward-thinking, climate-resilient industry that puts people and the planet first.

"I'm committed to helping drive that vision forward, where growers are supported, our story is celebrated, and our industry sets the global standard for sustainable production."

CRDC congratulates Grace and the Cotton Seed Distributors Researcher of the Year Dr Murray Sharman, a Principal Plant Pathologist (Virology) at Qld DPI. Murray oversees national virology diagnostics and research and plays a crucial role in biosecurity preparedness. (See our next edition of *Spotlight* for the story on Murray's contribution to industry.)

## Fresh, bold ideas

CRDC Executive Director Allan Williams says Grace and fellow Young Achiever finalists Jacob Booby and Blake Palmer were now a part of the alumni of an award named for one of cotton's first consultants, the late Chris Lehmann.

"Chris was a passionate supporter of young people in the cotton industry, so it is fitting that this award continues to carry his name," Allan said.

"Chris's legacy in the cotton industry is continued by the next generation – his son Paul and daughter Jess, who continue their involvement in their family's farm.

"This generational change is being reflected right across our industry as the third generation of Australia's pioneering growers begin to take the reins, and as we welcome entirely new cohorts of young people to cotton, bringing with them fresh, bold new ideas for the future.

"CRDC shares this focus on the future, so we are delighted to support the Young Cotton Achiever category."

Grace says she's honoured to receive the award, given the very experienced field on nominees and previous winners.

"I'm honoured to even be named as a finalist among other young women from our valley such as Jess Strauch and Elsie Pearce, who I look up to," she said.

"I consider it an honour to be named alongside them."

"We have such a vibrant valley of young people, and in particular a lot of female young guns."

# Technology high on the agenda as industry looks to optimisation

Technology, innovation and new products along with an inspiring mix of keynote speakers and research were highlights for the hundreds of people who attended the 2025 Cotton Collective and Trade Show, held in Toowoomba (Barunggam country) in early August.

The three-day Collective and Trade Show is an initiative of Cotton Australia and the Australian Cottongrower Magazine. The event included a bus tour and two full conference days, culminating in the 2025 Cotton Industry Awards Dinner. The two days of sessions were highly popular, with talks focused on megatrends, growing a successful family farm business, practical tech, and Australia's place in the global cotton community.

A feature this year was the focus on the impact of technology on modern-day farming practices with sessions designed to help growers get better results on farm. A new product section hosted by *Cottongrower Magazine* in the trade hall offered exhibitors the chance to highlight new farm-focused technology and a practical tech on the farm session focused on drone spraying. The session was led by Emerald (Gayiri country) cotton grower Aaron Kiely, alongside Felton (Barunggam country) grower Matt Richards and SkyKelpie founder Luke Chaplain, whose company specialises in aerial mustering.

For Aaron, adopting drones on his farm was about finding a smarter, more flexible way to tackle the challenges of farming. By replacing conventional methods of applying growth regulators, herbicides and insecticides with drone application, he can better manage crop architecture, variability in his soil types and application accuracy, and negate compaction. Aaron said the capital costs involved were another primary reason for their use: a drone can come in at around $60,000, while spray rigs can now top the million-dollar mark.

**CottonInfo Program Manager Janelle Montgomery with panellists from the rapid-fire research session: Richard Quigley, Sam Lee, Lauren Roellgen, Dr Malcolm Gillies, Dr Merry Conaty, Rene van der Sluijs and Rob Imray.**

## Engagement and collaboration

Cotton Australia General Manager Michael Murray said there was enthusiasm among attendees about what new products are available and where technology is heading.

"This was evident in the turnout for the Collective this year, and how well the sessions were supported," Mike said.

"The level of engagement and collaboration was typical of the deep connection between industry participants.

"The social and personal learning elements of the Cotton Collective cannot be overstated. Growers share their own journeys in an informal setting, and the industry gains overall because those lessons make their way back to individual farms."

CottonInfo Program Manager Janelle Montgomery chaired the rapid-fire research session on the final day, showcasing a number of CRDC-supported researchers and research projects.

Panellists included 2025 CRDC Chris Lehmann Young Achiever of the Year Grace Griffiths of Goondiwindi (Bigambul country), who has become well known for her ability to simplify carbon and emissions. Trangie grower (Wiradjuri country) and CRDC/Cotton Australia-supported Nuffield Scholar Richie Quigley shared insights from his study on retaining crop residue in cotton farming systems (see *Spotlight* Autumn 2025 for the full story), and UniSQ's Dr Malcom Gillies talked bankless channel optimisation, from his CRDC-supported research project.

CottonInfo Fibre Quality Technical Lead Rene van der Sluijs broached the subject of plastic contamination, and CRDC General Manager, Innovation, Dr Merry Conaty updated attendees on the CRDC-led Australian Cotton Industry Data Platform.

**For more**

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# From little things big things grow with Grassroots Grants

Forging partnerships between cotton growers from north to central Queensland is creating knowledge and support networks.

Central Highlands' growers George Sypher and Max Vowell from Cowal Agriculture, with NRG Ag's Avanell Morawitz and Clementine Morawitz taking a close up of cotton in the Ord on a trip made possible through CRDC's Grassroots Grants.

Through a CRDC Grassroots Grant, members of the Central Highlands Cotton Grower and Irrigators Association (CHCG&IA) spent a week in the north of Australia, knocking out over 13,000 kilometres to share information and reconnect with their northern counterparts.

The trip involved CHCG&IA members, agronomist Josh Bell, CRDC Senior Innovation Broker Susan Maas and Cotton Australia Central Highlands Regional Manager Robyn Lehmann. Cotton Australia Senior Policy Manager Simone Cameron, who is based in Katherine NT (Jawoyn country), also joined the group.

The growers made the most of being up north, visiting 13 farms across WA and NT, including farms belonging to cotton growers both old and new to the north. Also on the agenda was a visit to the Katherine Research Station, where CRDC-supported variety and nutrition trials are underway, and the Northern Australia Crop Research Alliance's Sunn hemp cover crop and rotation trials in WA.

Susan Maas has worked for CRDC as an Innovation Broker from her home in Emerald (Gayiri country) for over a decade, and developed long-standing connections with growers and researchers in the Central Highlands.

She said the trip north resulted from a Grassroots Grant a few years ago, where northern growers travelled to Emerald to see what they could learn from growers there to implement in the north, due to some climate similarities and conditions.

"There's a lot we can learn from each other in respect to our climates and the unique and evolving challenges involved," Susan said.

"The aim for the NT and WA growers was understanding the challenges the Qld growers had faced, dealing with monsoon conditions."

Earlier this year, the NT growers extended a reciprocal invite to the Central Highlands growers to go north to see how they were faring.

"The grant was about going north and following up on the discussions held at Emerald and looking at the NT cotton to see what had worked and what hadn't," Susan said.

"There are growers in Kununurra who want to look at longer flowering, and while long season cotton isn't able to be grown in WA, we could take some principles from it."

Shared themes are the effect of humid growing

conditions, potential cover cropping options and the importance of trial work to refine the crop management system.

Further to advancing agronomic information and understanding crop production challenges, the CRDC Grassroots Grants program recognises the importance of grower connections with each other and with industry bodies.

### Bringing people back together

For Robyn Lehmann, there was an important added benefit to growers from the trip they hadn't anticipated.

"I saw a fantastic reconnection of growers within our own CGA, and the younger generation connecting well with more senior growers," Robyn said.

"We didn't realise before this trip that we were all really wanting this reconnection.

"There was such a great opportunity for exploration of ideas and observations during the trip, through shared learnings, recognising similar challenges between the 'older' growing region of the Central Highlands with the newer growing regions of NT and WA.

"There was a lot of encouragement from our group for the northern growers to keep trialling, finding ways, utilise the CGA, Cotton Australia and CRDC resources to build capacity of knowledge to keep improving the region to see results."

The simple Grassroots Grant is now seeing long-term benefits based on the connections made.

Robyn recently arranged a virtual catchup with the Emerald growers, Susan and Simone and invited along Hugh Ball of 'Manbijim' Kununurra (Miriwoong country) and Andrew Parkes of 'Blackbull Station' in NT (Malak Malak country) to give updates on how their season has progressed since the visit in April.

"Both Hugh and Andrew gave updates on their learnings and findings since the visit," Robyn said.

"It was a fantastic reconnection of the growers from both regions again and we've arranged for the next online catch up to be more towards September/October when the season in the north draws to an end."

For CRDC, this is fantastic news.

"It's really important for CRDC that the CGAs are engaged in the industry and that's why we support these trips through our Grassroots Grants program," Susan says.

"The conversations that happen on these trips build the local relationships and there is huge value in sharing information across the regions: we've seen these tours improve irrigation efficiency, for example, by bringing new information, techniques, technology and infrastructure to growers from the south to the north of NSW, and vice versa.

"There is a lot to be learned from people challenging how you do things or sharing how they approached a problem.

"On this trip north, for me it was good to just listen to the growers talking among themselves, as well of course of the discussions I was a part of.

"It helps me understand the research needs and what CRDC can do to support them through research and for me to keep practicality at front of mind."

## Where the learning happens...

Cowal Ag operations manager George Sypher says regardless of where in Australia you are, the aim is the same – to grow high yielding, good quality cotton.

"And it's always interesting to learn how people are doing that," he said.

"There's so much value in these trips for all growers, because cotton growing is always evolving and no two seasons are the same, so there are always new challenges and rewards.

"The learning always goes both ways, and there is a mix of cotton growing experience now in the north, but having said that, even the experienced growers who have gone north are on a learning curve due to different climate, pests and soil constraints to name a few factors.

"We visited some growers fairly new to cotton who wanted to know what we do from step one, while some experienced growers from the south said they were back on a learning curve.

"Even the Ord has a long history with cotton but is back in what you might call its infancy, and the questions now are how do you grow it using Bollgard 3, transport and gin it.

"Even here there is no recipe book. It took us a long time to learn how to grow it, with the help of R&D, and now the long season cotton has made the Central Highlands.

"What we do here won't necessarily work up there, but there might be an efficiency aspect in irrigation or nutrition, or constraint you're working through that offers some usable options.

"These tours are fantastic to share insights, as growers have mud on the boots and shadow over the paddock and that's where the learning happens."

The grower tour created an informal and relaxed atmosphere for sharing.

"How often do you find at a meeting there's a grower there who doesn't say much or have any questions but in a one-on-one situation with another grower they open up," George said.

"That's because you're talking face-to- face with someone who lives and breathes it too and you know what they are going through.

"This tour offered plenty of those opportunities, and it's little things we are talking about while driving around that can be really valuable.

"It's the same with some people are not forthcoming with information in a group setting.

"But once you build that rapport it creates the conduit where people can ask questions and the ability to bounce ideas off each other."

# Grants hold broad benefit for growers and communities

The CRDC Grassroots Grants program can help make good things grow in the field.

Applications are now open with $50,000 available to support growers.

The program offers grants of up to $10,000 for initiatives to be delivered by Cotton Grower Associations (CGAs), whose members bring ideas and requests. Grants over the years have seen this initial investment turn into wide ranging knowledge sharing and practice change, with real returns for growers and their regions.

Southern Valleys Cotton Growers Association (SVCGA) applied for a CRDC Grassroots Grant to improve the soil health of the Murrumbidgee Shire Community Demonstration Farm at Coleambally (Wiradjuri country), to maintain its value to the community while also offering valuable extension opportunities.

The 400-hectare farm has been at the heart of farming knowledge and fundraising for the town since its inception in the 1960s, run almost entirely by local volunteers and farmers. Cotton and other crops are grown by local growers, with proceeds going to local initiatives. However, continuous cropping and soil variation was threatening the viability of this important icon.

The SVCGA project was developed and managed by local consultant James Kanaley, who saw an opportunity to identify local constraints and convey the knowledge and outcomes more broadly to local growers.

"This farm highlights some of the issues we have across the district. We have variability that you won't find in a lot of other growing regions, and traditional soil sampling methods may not pick up on these constraints," James said.

To collect more accurate data and assess soil variability, intensive grid soil sampling was undertaken along with EM surveys, which allowed accurate variable rates applications, translating to healthier soil and saving on input costs. This attracted a lot of interest from the cotton growing community.

"These improvements will make a huge difference to the Demonstration Farm's soil health and ensure this community asset can continue to operate in the Coleambally community in the future, providing a learning environment and financial support," SVCGA President Joe Briggs said.

**Coleambally cotton grower Chris Gardiner, Coleambally aged-care facility manager Karen Hodgson and Coleambally Demonstration Farm Vice President Danny Graham. A CRDC Grassroots Grant is helping ensure the farm's productivity into the future.**

"We are also seeing benefits through adoption of practices by other growers, so it has been and continues to be a very worthwhile project all round."

Since 2011, CRDC has supported nearly 100 projects directly benefiting growers and their communities through Grassroots Grants. Projects have covered an array of topics and approaches and all tailored to local needs across the cotton growing valleys. Projects have included improving climate and spray drift management by creating weather networks, and conducting on-farm trials into nutrition, compaction, cover cropping and soil remediation. Training is often a popular topic, with work health and safety, best practice spraying and digital skills workshops held in many valleys. Some grants have facilitated workshops for growers trialling new technology or irrigation layouts; others have gone towards supporting growers to undertake research tours of different valleys.

CottonInfo Program Manager Janelle Montgomery leads the Grassroots Grant program for CRDC, and CottonInfo Regional Extension Officers work closely with CGAs and Cotton Australia Regional Managers to develop and carry out projects.

"One of the major benefits of these grants is that they can be tailored to the needs of growers and consultants in each valley. They're easy to apply for, don't involve a lot of paperwork, and funding is available now," Janelle said.

**For more**

**CRDC Grassroots Grants**

www.crdc.com.au/growers/community-grower-support


# Banking on it: what's the value in changing the system?

The adoption of bankless irrigation systems may enhance farm productivity and resilience, leading to potential economic benefits.

**ABOVE:**
**The cotton industry and CRDC has supported improving knowledge around bankless channel systems, which are of great interest to irrigators for many reasons.**

A new cotton industry report has found that bankless irrigation systems can reduce labour costs by $230 per hectare and offer a 20 per cent water saving. Potential increases in asset value between $500 to $2000 per hectare are also possible.

The "overwhelming wash up" of the report is that where labour is really scarce, a system change to bankless channel will add more value.

That's according to Ag Econ principal economist Jon Welsh, who undertook the in-depth study on behalf of CRDC, investigating the full economic impact of bankless channel irrigation systems on sustainability metrics, land value and the reasons growers move from siphons to these configurations.

Prompted by discussion at the irrigation session at the 2024 Australian Cotton Conference, Jon developed the project which included a survey of irrigators, land valuers and rural bank managers along with economic modelling and analyses.

"The responses revealed that especially in more remote areas, having a less-labour reliant system is more relevant in terms of the value it adds to an operation," Jon said.

"While reconfiguring irrigation layouts can be costly, growers that plan and undertake the development themselves can manage this cost-effectively, representing a shorter payback period."

For example, putting in bankless set ups may include widening channels and installing bigger pumps to move the water across fields. Alternatively, small pipes through the bank offers a lower cost scenario because it involves less than other capital works with big ticket items like increasing pump station capacity.

"A small pipe through the bank system can pay for itself in the first crop in some instances where the irrigator can implement the necessary works themselves in a staged process," Jon said.

Jon's study investigated two key questions:

- What are the economic and financial implications of improving farm productivity in ways that enhance system and climate resilience?
- Does installing bankless channel irrigation lead to a more robust farming business with a flow-on appreciation of farmland value?

Over the past decade, as bankless irrigation increases in popularity, irrigated industries have rigorously evaluated the business case for it. A previous Ag Econ study identified a threefold benefit: greater efficiency in water use, labour and nitrogen application.

As part of this project, Jon conducted a survey among specialist property valuers and irrigators. This found that the economic gains to asset valuation of bankless systems can range from $500

to $2000 per hectare (ha), thanks to improved labour productivity and the prospects of higher yielding crops from better drainage.

"We found that farms employing these systems are more resilient, frequently operate with lower input costs, and manage crops with enhanced precision through agile water management," Jon said.

"We also know that in preparing our cotton systems for the likelihood of increased intensity in rain events in the future, improving drainage offers immediate benefits from avoided denitrification of nitrogen fertilisers and improved yields from reduced waterlogging.

"Consequently, aligning bankless irrigation systems with best practice management offers dual advantages – improving climate preparedness and compliance with emerging mandatory reporting requirements in agricultural supply chains."

## The benefits of bankless

As bankless irrigation systems eliminate the need for portable siphons, they substantially reduce labour needs. Structurally, designs may vary, but typically all bankless systems feature high flow rates, irrigating all furrows within each bay simultaneously. They also allow more rapid and efficient removal of stormwater caused by intense rainfall, which mitigates denitrification and the production of nitrous oxide emissions as a result.

Coupled with remote sensing and automation, these systems can also enhance efficiency, improved energy conversion and higher machine productivity.

Research across commodities has demonstrated that bankless systems may increase input efficiencies such as water and nitrogen use, though the extent of these improvements largely depends on how well the system was initially performing.

"On-farm sustainability initiatives like bankless irrigation can improve water and labour efficiency, potentially increasing property value through higher productivity and operational efficiencies," Jon said.

"These improvements may be viewed as strengths or structural enhancements, while climate risks and opportunities, such as improved drought resilience, while a higher risk system (traditional siphons) reduces the estimated purchase price."

This study used a Whole Farm Model (WFM) approach to evaluate valuation changes under two bankless installation cost scenarios ($600/ha and $4200/ha) across 400 ha and 782 ha developments, respectively. When factoring in a 20 per cent water saving and a $230/ha reduction in labour costs within the new scenario, the WFM indicated stable asset and earnings levels, resulting in a consistent and more resilient overall farm equity position. Return on assets and equity declined notably in the high-cost ($4200/ha), low-valuation uplift (+$500/ha) scenario for whole-of-farm development.

"Less labour requirements, improved WUE and NUE along with an increase in land value are possible with a move away from traditional siphons, but there are aspects growers need to take into consideration," Jon said.

"For example, these study results may not be applicable to farms with significantly different soil types, climates, debt ratios or resources compared to the representative farm we used for the study, which is in the Namoi Valley.

"However it does provide broader insights into farm equity that growers can take into consideration when considering or planning a change in irrigation layout to a less labour-intensive system.

"Know the efficiency of your current system and depending on your financial situation, consider how much of the reconfiguring of the layout you can do yourself."

**For more**

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ANDREW GRESTE

**Pipes through the bank are another irrigation system that may offer a less-expensive alternative to bankless channel, while still offering labour savings and the opportunity to add automation.**

# Growers meet to talk weeds in non-farmed areas

Managing problem weeds in non-farmed areas is a source of frustration for land managers, including cotton growers.

**Healthy native vegetation areas offer benefits through improved biodiversity and ecosystem services, while avoiding the spread of weeds into farmed areas.**

Whether it's a riparian zone, treeline or unfarmed paddock, weed control is difficult, time consuming and expensive. However unmanaged weedy areas can cost growers and the environment in the long run, harbouring pests of cotton and competing with plant species that harbour beneficial insects and create biodiversity. They're also an obvious source of weed seeds and pollen that contaminate farmed areas through wind and soil.

A new project led by Griffith University in partnership CRDC is helping to manage problem weeds in non-farmed areas. Researchers in this three-year project are working to develop an easy-to-use decision support tool to support riparian weed management.

"Despite having various weed management options available, many growers find themselves struggling with adopting them on-farm," said Griffith University social scientist Dr Lucy Bird.

Lucy is working on the project with fellow researchers Dr Rebekah Grieger, Professor Samantha Capon, Associate Professor Kerrie-Foxwell Norton, Dr Syezlin Hasan and Dr Michelle Ward.

"The solutions don't always fit the real-world constraints they face. Time, cost, accessibility and uncertainty about what works in specific conditions are some of the barriers that keep effective weed management from happening, even when growers know it needs to be done," Lucy said.

CRDC Innovation Broker Stacey Vogel says this project is designed to help growers cut through the complexity of riparian weed decisions, compare the cost and impact of different management strategies and boost productivity while protecting ecosystem services.

"To start this project off, we invited cotton growers to an informal, hands-on conversation," Stacey said.

"We wanted to know their experience with weed control – what's worked, what hasn't and what still frustrates them.

"We've also enlisted our CRDC-supported Nuffield Scholar and ag consultant Kate Lumber from Moree to talk with growers."

In partnership with the CottonInfo network, meetings were held mid-August in Moree, Wee Waa (Kamilaroi country) and Goondiwindi (Bigambul country).

The final tool will be designed based on the feedback received at these workshops and will consider how growers make decisions. Growers will be able to prioritise weeds of potential concern in relation to their unique circumstances and to identify the most cost-effective management strategies.

"Instead of developing another weed management strategy, we're building a tool that works for growers in their specific situations and with their constraints, and rather than starting in the lab or the office, we're starting with growers," Lucy said.

## Have your say

Growers who were unable to attend the workshops are still welcome to have their say by contacting the project team.

"Whether implementing innovative strategies or struggling with where to start, your experience is valuable," Lucy said.

"Effective weed management isn't only about solving today's problems but building resilience for tomorrow.

"By taking the time to understand what works in practice, we aim to bridge the gap between available solutions and real-world adoption.

"The result should be a resource that helps growers figure out how to implement solutions in their specific situation."

**For more**

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# Time, cost and ability hinder riparian weed control

Growers are aware of environmental weeds in unfarmed parts of their farms, but they often remain unmanaged due to time-pressure, lack of affordable options and little to no perceived value or economic benefit in doing so.

Kathryn Mulligan's family farms at "Retreat" west of Moree (Kamilaroi country). Like many growers, riparian areas are a major area of concern for weeds management and is why Kathryn attended the recent meeting in Moree with researchers.

"Managing environmental weeds competes with other aspects of farming in terms of time and resources," Kathryn said.

"We would like manage these areas for weeds and do it well, but when we are time poor and have a choice between managing our productive farmed and non-farmed areas, coupled with the cost, it's an obvious decision as to what gets priority."

Other issues raised by growers at the meeting were knowing which weeds are a priority and the regulations and permits around managing them. They said advice at times can be conflicting and that some methods of control are not suitable where other beneficial species are present, or along waterways.

Mimosa/briar bush *(Vachellia farnesiana)* is a native of Central America and was used as an example by some growers of how control can become complicated. Now classed as a native invasive weed, a permit is still needed to manage it, even though by law in Qld 'everyone has a general biosecurity obligation to take reasonable and practical measures to minimise the biosecurity risks associated with invasive plants under their control'.

Weedy areas also harbour feral pigs, who sadly don't eat the weeds but do transport potentially dangerous weed seeds and diseases into farmed areas. One example is noogoora burr which through CRDC research was found to host and harbour Verticillium wilt. However not all weed species are seen by growers as being linked to the farming system in terms of harbouring pest and disease threats that could have an economic impact. The cost of weed control means that it is cheaper and easier to put up fences to keep pests out of farmed areas.

**Moree cotton grower Kathryn Mulligan talks with researcher Dr Rebekah Grieger at a workshop to discuss weeds management in riparian and other non-farming areas in Moree (Kamilaroi country).**

Location also plays a part.

"We obviously can't bring in big equipment into these areas, which means smaller gear and that means time," Kathryn says.

"We could potentially contract a specialist outfit, but out here there are issues like distance from town and therefore how we accommodate them.

"Weed control isn't cheap, and the big worry for me is that in these riparian areas, even if we could get rid of all the existing weeds, the next time the river's been up or flooded, it carries seeds and I imagine we'd be back in the same position.

"I think a lot of us feel that while we will never have these areas pristine, we'd like to be able to clean them up.

"All these factors are the reason I'm at the meeting, because I want to understand what to do and how to do it.

"These meetings are also great to pick up information from discussions with other growers."

Griffith University researcher Dr Lucy Bird has found, from her discussions with growers, that biodiversity and natural capital are on growers' minds in how they manage native/riparian areas.

"We are finding that growers want to be able to manage environmental weeds, particularly if there were more defined benefits in economic or natural capital or carbon but they don't know what managing them holds in terms of value in these areas at the moment.

"Growers are definitely looking for solutions on how to manage weeds in these areas and we want to supply that."

# Residuals for effective cleanup of irrigation systems

Clear guidance is now available for growers on managing weeds on irrigation channels using residual herbicides.

With support from CRDC, CottonInfo Integrated Weeds Management (IWM) Technical Lead Eric Koetz of NSW DPIRD undertook experiments at IREC field station at Whitton in the Riverina (Wiradjuri country), to test herbicide effectiveness on weeds in channels.

Previous CRDC-supported weeds surveys and research has shown that irrigation channels are major sources of weed seeds, contributing to the overall weed seed bank on farms. Weeds left around channels not only harbor pests and diseases, but they also create risks for crops and obstructing water flow, leading to inefficient irrigation. Larger weed species can destabilise channel banks, causing erosion and costly repairs.

"The aim of any weed management strategy is to start the season weed-free, whether that is in field or in non-farm areas such as irrigation channels, so we undertook these trials in winter," Eric said.

Residual herbicides for control of broadleaf and grass weeds were trialled, with treatments including the control (glyphosate), Valor, Diuron, Stomp Xtra, Arsenal, Arsenal + Stomp Xtra, and Cavalier. All products were applied at a water rate of 100 L/ha at the same time.

"I found there were differences in longevity of control, and which weeds were most affected," Eric said.

"Arsenal treatments provided the best long-term control, keeping channel banks clean for over six months.

***"In a robust residual herbicide program, weed emergence is reduced which takes the pressure off knockdown herbicides"***

ERIC KOETZ

**Weeds on channel banks and around irrigation systems need to be controlled to protect the entire farming system. New research is showing the most efficient and effective products to use.**

"Valor, Diuron and Cavalier showed good initial control but lacked long-term residual control, while Stomp Xtra was effective for grasses but had poor broadleaf control and short-term efficacy, meaning these products will require follow up weed control."

Eric said there were other observations around the herbicides that should also be taken into account when deciding which is the best fit in an IWM system:

- Valor offers medium-term control but requires follow-up herbicide programs.
- Arsenal is best for long-term control but should be applied during non-crop seasons and treated water to be retained on farm.
- Stomp Xtra is effective for grasses but has limited broadleaf control.
- Diuron requires moist soil for effective application and follow-up control is necessary.
- Cavalier is similar to Valor but does not provide long-term residual control.

Just like weeds in fields, a best practice approach should always be taken.

"By introducing a robust residual herbicide program, weed emergence is reduced which takes the pressure off knockdown herbicides such as glyphosate or gramoxone," Eric said.

"Frequent monitoring allows for early detection and removal of new weed incursions, using IWM, combining herbicides and mechanical removal methods.

"Timely control targets weeds early in their growth stage for effective management, and retaining irrigation water on the farm helps reduce the spread of floating weed seeds.

"Taking your eye off the ball by allowing weedy irrigation channels to top up weed-free fields places undue pressure on in-crop weed control and present a potential biosecurity threat."

**For more**

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Blake Palmer is undertaking his PhD study into compaction with support from CRDC. He's found that compaction is moving out of the furrow to below the plant line. In his role as CottonInfo Soil Technical Lead Blake also responded to grower concerns about picking and compaction during wet harvests, with surprising results.

# Worth the wait?

## Delaying harvest in a wet season

New data has questioned how much compaction is really avoided by delaying picking after rain events.

Significant rainfall around defoliation and picking sparked compaction fears among growers this season. Rainfall totals of 250mm-plus through the Namoi and Gwydir valleys and Southern Qld led growers to contact the CottonInfo team with questions around how long they should wait for fields to dry before sending in the pickers.

Further investigation and farm visits led CottonInfo Soil Health Technical Lead Blake Palmer to some potentially surprising findings around compaction. Blake is based in Narrabri (Kamilaroi country), and shares the Namoi CottonInfo Regional Extension Officer (REO) role with Bob Ford. He's also undertaking his PhD study into compaction, with support from CRDC.

On the back of grower concerns, Blake and Bob undertook soil surveys throughout the Namoi and at St George (Kooma country) with fellow Border Rivers REO Andrew McKay.

### Waiting made no difference

Findings from St George were that by waiting 17 days for soil to dry out after a first 'wet pick' attempt made no difference to subsoil compaction. Blake also found movement of compaction from the furrow through to the hill (see Figure 1. showing soil penetrometer results at these three locations).

"Our measurements showed that waiting just over two weeks between picking dates actually didn't reduce the compaction at all in the subsoil, the clay is too heavy and holds water too well," Blake said.

"While growers should wait until a field is trafficable, we now know it is not practical to wait for the subsoil to dry out to reduce compaction.

"Despite best efforts in managing to avoid

compaction – if significant rainfall occurs between defoliation and picking in heavy clay soils then compaction is highly likely to occur.

"We found compaction across almost all fields surveyed, frequently around the 50cm depth which is below the reach of conventional deep ripping."

Compaction severity varied based on soil type (with heavier clays more susceptible than lighter country), the amount of rainfall since defoliation and management history. Fields with a strong history of crop rotation appeared more resilient to severe compaction.

## Managing compaction

Growers are managing soil compaction in different ways including crop rotation and tillage, and Blake had some advice for growers.

"Regardless of remediation choice, the key is drying the soil which is most effective by growing a crop – whether using that crop growth to remediate the compaction on its own, or to dry down the profile to where tillage may be effective," he said.

"Crop rotation should be considered because in shrink-swell clays commonly found in cotton fields, rotations can drive the wetting and drying cycles which remediate compaction.

"In non-swelling soils, rotating with crops which contrasting rooting architecture can penetrate compacted layers over time and build soil structure, making soils more resilient to future compaction and even disease."

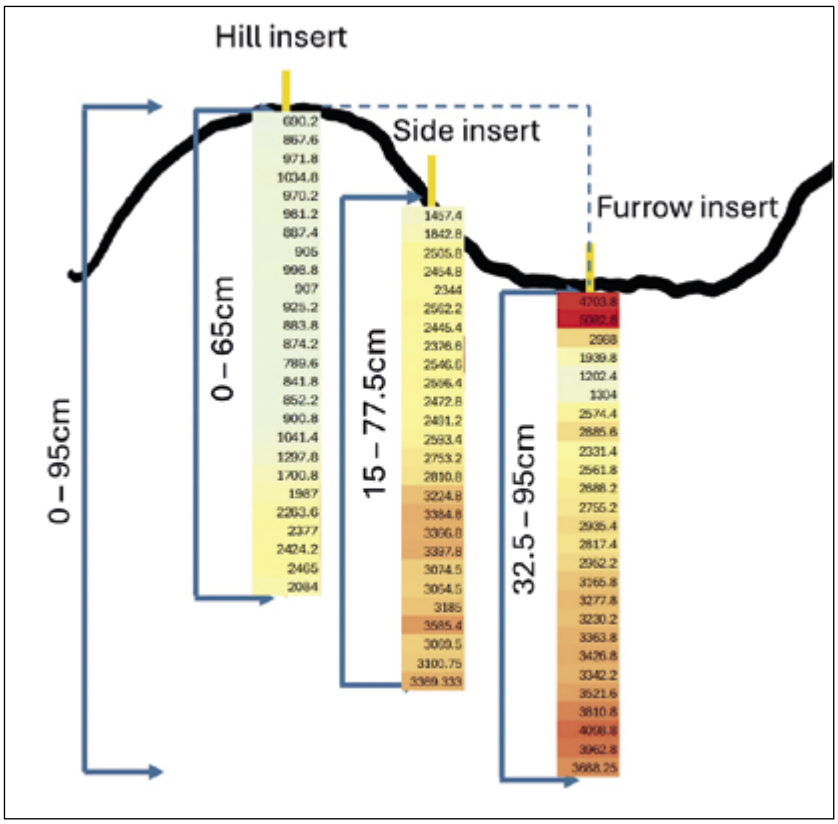


**Figure 1.** Blake used a cone penetrometer to determine subsoil and lateral movement of compaction. Measurements are given as soil resistance in kilopascals (kPa), with higher than 2000 kPa considered high soil strength, thus limiting root growth. In the hill insert soil strength exceeded 2000 kPa at 55cm deep, however almost all the measured depth increments in the side and furrow inserts exceed 2000 kPa, some by a significant margin. Blake says due to the importance of cotton's lateral roots, it is highly likely that these soil strength measurements will limit the crop's ability to access water and nutrients. Further, the soil strength in the furrow and the side of the hill will likely hinder water infiltration and movement, making irrigation and subbing up of the hills challenging.

***"In non-swelling soils, rotating with crops which contrasting rooting architecture can penetrate compacted layers over time and build soil structure, making soils more resilient to future compaction and even disease."***

The observation of compaction moving under the plant line is concerning.

"While generally found in the furrow, compaction is creeping into hills, which is definitely where you don't want it due to the negative impact of water infiltration, nitrogen movement and uptake, root growth and general soil health," Blake said.

"Keeping wheel traffic to the furrows by avoiding driving on top or side of hills keeps the compaction under the wheel tracks and reduces the compaction under the hill in the plant line."

'Deep' ripping is often cited as a remediation tactic, however Blake advises caution.

"If ripping – know your soil!" he says.

"Know where your compaction layer is and if you can realistically reach it with tillage, keeping in mind we found that most compaction is occurring at that 50cm mark.

"Know your subsoil constraints – if your soil is dispersive, then deep ripping without adding amendments (e.g. gypsum, organic matter) will make your structure worse and never deep rip into wet clays – it is not possible to shatter compaction in wet clays, this will only smear the soil and make the structure worse."

The CottonInfo response to grower compaction concerns included compiling a *Wet picking & compaction* fact sheet, along with YouTube videos.

Soil health workshops were also held in central Qld (see next story) and the Gwydir, with REO Greg Bramley and Northern Slopes Landcare hosting a soil management best practice workshop and soil pit at 'Beela' (Kamilaroi country) with Blake, cotton industry research scientist Dr Guna Nachimuthu of NSW DPIRD, Sydney University's Tim Weaver, CSD's Dr Oliver Knox and UniSQ's Cameron Leckie.

**For more**

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# They're down to earth at Emerald

One of the newest CottonInfo team members, Central Queensland's Regional Extension Officer Tami Barunda, has hit the ground running with a well-attended and insightful soil and nutrition workshop in Emerald (Gayiri country).

Grower Greg Kauter and the Cowal Ag team at Emerald provided the venue, where around 40 people turned out along with presenters Blake Palmer, CottonInfo's Soil Technical Lead, and Back Paddock's Chris Dowling to share their expertise and passion for soil health and crop nutrition.

Tami says one of the highlights was examining soil cores that had been collected from different paddocks and situations, with cover cropping, fallow, and back-to-back scenarios.

"It was fascinating to see cores and hear Blake explain the differences in soil structure, size, and texture across the samples," she said.

"The cover crop paddock showed significantly better structure, with richer colour and more uniform shape compared to the others and demonstrated the benefits of incorporating cover crops into rotations, particularly in enhancing soil health and resilience."

A soil pit session was also held by Blake, who gave an in-depth explanation of soil structure and compaction. Attendees learned how to visually identify signs of compaction and discussed practical strategies for remediation.

"This hands-on session helped participants better understand the physical characteristics of healthy soil and the impact of management practices on soil compaction," Tami said.

"Blake's key message on compaction was, 'It happens. When it does, the key to fixing it is dryness – whether using tillage or rotation crops, the soil either needs to be dry enough for tillage to shatter the compacted layers or needs to dry out over multiple wetting-drying cycles for rotation crops to bioremediate the soil structure.'"

***"The key to fixing compaction is dryness – whether using tillage or rotation crops"***

**CottonInfo Central Queensland Regional Extension Officer (REO) Tami Buranda held her first workshop in central Qld. Tami is pictured with CRDC Senior Innovation Broker Susan Maas at Cowal Ag, Emerald (Gayiri country).**

Earlier in the day, Chris Dowling shared some excellent insights on soil nutrition.

"People were deeply engaged, asking insightful questions and sparking meaningful discussion. The session was rich with practical knowledge and real-world applications," Tami said.

"One of the most valuable insights was the importance of treating the cause of poor nitrogen use efficiency (NUE), not just the symptoms. High nitrogen rates and low efficiency often stem from reactive management.

"Long-term soil health and nitrogen efficiency improve when we focus on what's really behind poor NUE."

Tami was keen to thank people who have been supporting her since joining the team.

"This was my first workshop in this role, so a special thanks goes to Cotton Australia Regional Manager Robyn Lehmann, CRDC Senior Innovation Broker Susan Maas, CSD Extension and Development Agronomist Nick Stewart and Cowal Ag whose hard work and collaboration were instrumental in making the day a success.

"Most importantly, I'd like to thank all who attended as your presence and participation made the event what it was. Without your engagement, the day would not have been nearly as impactful.

"A highlight was realising just how valuable these programs are, not only for the knowledge they provide but for the way they bring our community together. We look forward to hosting more of these sessions in the future."

**For more**
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